



Biodiversity Conservation at the Landscape Scale

A Program of the Wildlife Conservation Society
Supported by the USAID/Global Conservation Program

The Eastern Steppe Living Landscape: Sustaining Wildlife and Traditional Livelihoods in the Arid Grasslands of Mongolia

Annual Report

October 2004 – September 2005

I. Summary of Activity Status and Progress

a. Introduction/Summary:

The Eastern Steppe of Mongolia is perhaps the world's largest intact grassland ecosystem. At about 250,000 sq km, the area is roughly the size of the state of Oregon. This vast wilderness is home to one of the world's last great spectacles of migrating ungulates, the Mongolian gazelle. Numerous other mammals live on the steppe, and there are many rare or critically threatened birds, including six species of cranes (almost half the world's species). The steppe is of international importance, and is a Global 200 Ecoregion, a Last Wild Place, and the location of Mongolia's first Ramsar site. Human populations on the steppe have historically been sparsely distributed and engaged in traditional nomadic livestock production, which had minimal impact on the ecosystem. This historical pattern of sustainable use of the steppe's resources has been disrupted by major socio-economic changes during the past fourteen years. Rising urban unemployment has increased reliance on hunting of wildlife for subsistence and income, while declining markets for meat and other livestock products have increased poverty among herders. The country's economic needs are also driving oil, coal, gas and mineral exploitation of the Eastern Steppe. Still more demand is driven by China, whose enormous resource needs are drawing it to the opportunities in Mongolia. The steppe is also the target of specific development interests from national and international actors and agencies. In the face of these myriad pressures, the development of a comprehensive conservation and natural resource management plan to preserve the integrity of the steppe, its wildlife, and the unique, traditional nomadic culture of its people is already overdue.

This report summarizes the second year results of the WCS/USAID Mongolia Living Landscapes Program, "The Eastern Steppe Living Landscape: Sustaining Wildlife and Traditional Livelihoods in the Arid Grasslands of Mongolia," funded by USAID's GCPII program. This five-year program was developed to help protect one of the last intact grassland ecosystems in the world. The Mongolia program officially began on October 1, 2003.

b. Highlights

Accomplishments for the program's second year:

- Hosted three international conferences: a three-day conference on Mongolian gazelle conservation and management, a two-day conference on wildlife trade in Mongolia, and a two-day conference on ecosystem health; each of these conferences presented suites of recommendations to the Mongolian government, a number of which have already been enacted.
- Completed a Przewalski's horse reintroduction feasibility study; identifying Nomrog Strictly Protected Area as the most appropriate location in the Eastern Steppe for future reintroduction efforts.
- Conducted a wildlife survey that identified poaching from Chinese incursions as the greatest threat to the unique Manchurian ungulate complex there; and subsequently held a training assessment for staff and agencies affiliated with Nomrog Strictly Protected Area.

- Conducted a survey of marmots across the entire Eastern Steppe region (marmots are the single most commercially important wildlife species on the steppe, but overhunting forced the government to place a ban on commercial hunting last year); this survey found marmots to be at surprisingly low densities, with 95% of burrow clusters empty and perhaps as few as 179,000 marmots remaining across the Eastern Steppe (a single confiscation at the Chinese border in 2004 included approximately 117,000 skins).
- Completed a study of wildlife trade in Mongolia, showing that virtually every economically important wildlife species is under severe decline due to uncontrolled hunting, primarily for export to the Chinese and Korean markets.;
- Performed a survey for avian influenza confirming the presence of H5N1 in a sample collected from a dead whooper swan on Erhel Lake by the United States Department of Agriculture (USDA) Poultry Research Laboratory in Athens, Georgia. Although the presence of H5N1 in migratory birds is of concern, the initial results from further testing indicate that the spread of disease in this population will be self-limiting with little to no risk to the human population in the area
- Continued gazelle and wolf research; the main focus was on “Gazelle Movement in the Eastern Steppe of Mongolia” and “Subsistence Hunting and Implications for Sustainable Management of Mongolian Gazelle,” which included presentations on these subjects at a number of international fora.
- Continued to collect spatially explicit information on threats to the Eastern Steppe environment to inform analyses associated with WCS’ planning approach for landscape conservation, known as the Landscape Species Approach. We believe that we have now collected enough data to move into the next phase of analysis and application in the form of landscape planning initiatives.
- Continued the monthly conservation information and networking series, providing information on a wide range of environmental issues to a large and varied audience within Mongolia.

A major change has occurred with personnel in Mongolia’s country program. Peter Zahler, previously WCS Mongolia Country Program Director, was promoted to the position of WCS Asia Program Assistant Director in January of 2005. As such, Zahler will be supervising the Mongolia Program from the WCS offices in New York, and presents a strong and motivated link with the wider WCS institution for assisting the Mongolia Program in backstopping and leveraging its work. Dr. Amanda Fine is now in-country and has taken over the position of WCS Mongolia Country Program Director and Chief of Party to the USAID Eastern Steppe Project.¹ We are extremely pleased that she has agreed to step in and take over the program, and we are confident that her skills will ensure that there is a seamless transition to moving ahead with conservation and management of Mongolia’s natural resource base on the Eastern Steppe and elsewhere in the country.

c. Table of Activity Status

Activity Number	Activity Title	Status	Page Number
Obj. 1	Develop and adopt participatory strategies to reduce threats to wildlife in the Mongolia Eastern Steppe landscape		4
1.1.	Refine an explicit model to articulate the causal relationships among conservation targets and threats	Initiated	4
1.2.	Identify principal actors to address threats and evaluate their capacity to do so	On track/ delayed	4
1.3.	Develop an adaptive, participatory and spatially explicit strategy for threat abatement and landscape conservation	Delayed	6

¹ Dr. Fine is a veterinarian currently completing her Ph.D. in epidemiology at Michigan State University. Dr. Fine speaks Mongolian and spent three years working and living in Mongolia from 1998-2001, first at a Henry Luce Scholar and then as the veterinary assistance project manager for the ACDI/VOCA “Farmer to Farmer” program.

1.3.1.	Choose Landscape Species for the Eastern Steppe through the Landscape Species Approach	Delayed	6
1.3.2.	Develop a spatially explicit representation for threat abatement and landscape conservation	Delayed	6
1.3.3.	Focus conservation activities toward the Eastern Steppe Landscape Species	On track	7
Obj. 2	Develop and implement sustainable and adaptive mechanisms to strategically address threats across the landscape		10
2.1.	Establish necessary management mechanisms	On track	10
2.2.	Enhance local capacity to implement the strategy	On track	13
2.2.1.	Enhance local institutional capacity	On track	13
2.2.2.	Enhance local community capacity	Delayed	14
2.2.3.	Enhance local disease management	On track	15
2.2.4.	Enhance local scientific capacity	On track	18
2.3.	Implement mechanisms for measuring success and adapting the landscape strategy	On track; aerial survey delayed	20
2.4.	Identify and strengthen constituencies for conservation at local, national and international levels to help ensure effective strategy implementation	On track	20
Obj. 3	Learning and teaching best practices in the Mongolian Eastern Steppe landscape and beyond		20
3.1.	Evaluate tools and best practices for site-based conservation and synthesize lessons for dissemination to a wider conservation community	On track	20
3.2.	Review and assess emergent issues in global conservation	Initiated	20
Obj.4	New York Coordination Unit Strategy: Guide the design and testing of wildlife-focused planning, implementation, and evaluation tools for effective conservation at a landscape scale, and promote learning across sites and beyond		21
4.1	Provide technical assistance to site-based conservation	On track	21
4.2	Design, implementation, and testing of decision support tools	On track	21
4.3	Catalyze cross-site and cross-organizational learning, and communication	On track	22
4.4	Application of Living Landscapes Program tools beyond core sites	On track	24
4.5	Ensure coordination and communication services for the program	On track	24

II. Detailed Description of Progress

a. Key short and long-term program objectives for the reporting period (October 2004 – September 2005)

In what is perhaps the largest remaining swath of ecologically functional temperate grassland in the world, WCS is developing and implementing long-term conservation measures at a landscape scale. We are doing this through working with key national, regional and local partners to address identified threats and opportunities, and by focusing research efforts on ensuring the conservation and management of wide-ranging and vulnerable Landscape Species that represent the diversity and integrity of the system. Over time, we plan to successfully implement and refine the Landscape Species Approach within the Eastern Steppe Landscape, thereby promoting this concept in other biologically critical landscapes in Mongolia.

As the Eastern Steppe Living Landscape program moves forward, it continues to be apparent that the greatest and most immediate threat to the Eastern Steppe landscape is poor planning and management at the central government level. This ranges from development schemes with no environmental or community-based accountability to a range of

ongoing initiatives (e.g., poisoning for pest control, park management, hunting laws) that are either based on poor science or are being initiated with little understanding of or care for the consequences. Therefore, in the short term (1-2 years), we continue to have two major emphases. The first is to continue developing policy recommendations on a range of critical issues that can be instituted by the appropriate agencies and institutions to alleviate immediate threats to the steppe landscape, wildlife and human communities that depend upon natural resources for their survival. We are providing valuable information to the central government on government-led development and management programs, initiatives, and directives so that environmentally sustainable international best practice is incorporated in plans for conservation, development and management of the Eastern Steppe. Our second emphasis is to develop and implement a landscape scale management planning process, using the WCS's Landscape Species Approach, by collecting and interfacing information about biological requirements of species and the human-caused threats that is necessary to guide management strategies and actions at a broad scale.

In the long term (3 years and more), we expect that our use of participatory initiatives for landscape conservation will allow us to continually develop strong working relationships with the range of actors in the region. Our landscape planning initiatives will help many different actors in the region design and implement more strategic and collaborative conservation interventions, monitoring and evaluation activities.

OBJECTIVE 1: Develop and adopt participatory strategies to reduce threats to wildlife in the Mongolia Eastern Steppe landscape.

Activity 1.1. Refine an explicit model to articulate the causal relationships among conservation targets and threats

Conceptual models clearly identify our goals and operational conservation objectives, and explicitly links both direct threats (e.g., poaching) and indirect threats (e.g., lack of effective laws) to our conservation goals. Conceptual models are also an essential step in the identification of strategic interventions that explicitly address key threats to the conservation of wildlife and the steppe landscape. The WCS Eastern Steppe project continues to collect information that will help us further refine our initial conceptual model built at the initiation of the project in 2003. We are more accurately defining threats to the landscape using the growing database of information on targets and threats collected from field studies, workshops, and socioeconomic surveys. We began this process by implementing a systematic and participatory assessment of threats to wildlife through a series of four threats workshops with local agency and NGO staff in each aimag and a 150-household threats survey to reach the herder community across the steppe. These data were to be analyzed over the winter and spring of 2005; unfortunately, due to the change-over in staff mentioned above these analyses had to be postponed. With a new Program Director in place, we plan to analyze and summarize these data during the upcoming fall of 2005 and winter of 2006, and then use the results to further refine the threats outlined in our conceptual model. We will also select our target species for landscape conservation (i.e., Landscape Species) during this period, and will use this information to more explicitly define our conservation targets. A range of partners (e.g., National University of Mongolia, Mongolian Academy of Sciences, Protected Areas Administration) has been solicited to join us in our threats assessments, selection of Landscape Species, and refinement of our conceptual model. We have specifically focused on the participation of agencies in the environmental sector and local communities, because these groups have very detailed and on-ground knowledge of threats. Revisions of the project's strategic model has been delayed due to changes in project leadership.

Activity 1.2. Identify principal actors to address threats and evaluate their capacity to do so

Identification and evaluation of key actors on the Eastern Steppe and within Mongolia's environmental sector has allowed the project to develop linkages across the political landscape, encouraged collaborative activities, and lessened negative impacts through poorly planned projects. This coordination is intended to encourage better understanding among potential partners about the suite of threats to the Eastern Steppe, and to forge common strategies for addressing them. We continue to use varied strategies in identification and evaluation: individual meetings with potential partners, holding a monthly conservation networking event, and through interactions in field-based collaborations and in WCS/USAID-sponsored workshops.

Meeting with potential partners and organizations: Project personnel continued to meet with various ministry and government personnel, including Ministry of Nature and Environment, Ministry of Health, Ministry of Food and

Agriculture, Ministry of Foreign Affairs, the State Specialized Inspection Agency, and governors and staff of all three Aimags (i.e., provinces) on the Eastern Steppe. We also held meetings with numerous development, NGO, and academic organizations, projects and individuals regarding WCS activities and potential collaborative opportunities. Through this process we have identified partners (e.g., the National University, Mongolian Academy of Sciences, the National Remote Sensing Center, the Protected Areas Administration,) and have initiated a range of activities with these actors (see below for specifics).

Conservation Information and Networking Event: A major barrier to effective conservation in Mongolia, and particularly with regard to actors working in the Eastern Steppe, is a lack of awareness and understanding of the collaborative potential among different actors. The lack of awareness of what other people are doing results in redundancy, inefficiency, and failure to incorporate relevant, up-to-date information in management activities. Therefore, WCS initiated and is currently sponsoring and hosting a monthly series of conservation information and networking events. The rationale for this activity is to encourage discussion, sharing of information, coordination, and even collaboration among the many and disparate organizations and individuals involved in conservation. Each monthly event includes a major presentation by an organization or individual involved in Mongolian conservation. At this early point in our activities, it has been difficult to observe any marked increase in collaboration, although continued high attendance (50-60 people typically) indicates sustained interest and potential for longer term benefits. Monthly events have included:

In October, Dr. Zeb Hogan of the UNDP-GEF Taimen Conservation Fund talked on the subject of taimen (*Hucho taimen*) conservation in Mongolia.

In November, Dr. Thomas McCarthy of the International Snow Leopard Trust talked on the subject of snow leopard (*Uncia uncia*) conservation in Mongolia and across the range states.

In December, Nyambayar Batbayar of the The Peregrine Fund and Boise State University gave a presentation to approximately 35 people on the ecology and behavior of the black (cinereous) vulture (*Aegypius monachus*) on central Mongolia (this project was partially funded by the WCS Research Fellowship Program).

In January, Baatar Tumenbayar, geochemist with the Mongolian Academy of Sciences, gave a presentation on "Mercury poisoning in the Boroo area."

In February, Nachin Baatarbileg, Professor of Forestry at the National University of Mongolia, gave a presentation on "Dendrochronology studies in Mongolia."

In March, Chimed-Ochir Bazarsad, WWF-Mongolia Conservation Policy Advisor gave a presentation, "An Overview of WWF-Mongolia Program" with a follow-up discussion of Environmental Impact Assessments.

In April, Sarantuyal Namsrai, Director of the Environmental Initiative Center gave a presentation on "Desertification in Mongolia."

In May, Dr Clyde E. Goulden from the World Bank-GEF ILTER Huvsgul Project gave a presentation on "Long term ecological studies at the watershed of Huvsgul Lake."

In June, Enkhtulga from the Khustain-Nuruu Project gave a presentation on "An overview of the Khustain-Nuruu Przewalski's Horse Project;" and Susan Antenen from The Nature Conservancy (TNC) gave a presentation on TNC's plans for Mongolia entitled, "Conservation by Design."

In July, new WCS Mongolia Country Program Director Amanda Fine gave a presentation on "The interface of wildlife, livestock and human health."

In September, two recent graduates from Mongolian National University spoke: Tuvshinjargal gave a talk entitled "Raising conservation awareness through traditional values," and Chimed-tseren gave a talk on the WCS/USAID-sponsored "Eastern Mongolia marmot survey."

Field-based Collaborations and Sponsored Workshops: The project has worked closely with a variety of actors in the environmental sector, especially those involved in the Eastern Steppe region, through collaborative field initiatives and in WCS/USAID-sponsored workshops. Field-based collaborations include a number of Mongolian gazelle field studies, a Siberian marmot survey, a Przewalski's horse reintroduction feasibility assessment, a training needs assessment of Nomrog Strictly Protected Area, and a wildlife trade study. Each of these activities is discussed in more

detail below. We also held full-scale workshops or conferences, including the “International Mongolian Gazelle Research Symposium/Management Workshop,” the “International Conference on Wildlife Trade in Mongolia,” and the “Participatory Workshop on The Livestock, Wildlife, and Human Health Interface in Mongolia.” Descriptions of these workshops can be found below, and lists of participants can be found as appendices to this report. As part of a broader effort to identify, reach out to, and develop relationships with key players in the Mongolian environmental sector, WCS was also a major participant in the “International Workshop on Conservation of the Mongolian Saiga Antelope” and the “International Workshop on Conservation and Management of the Gobi Bear” held in October and November of 2005.

Activity 1.3. Develop of an adaptive, participatory and spatially explicit strategy for threat abatement and landscape conservation

Activity 1.3.1. Choose Landscape Species through the WCS’s Landscape Species Approach

The Landscape Species Approach is a wildlife-based strategy used to define ecologically meaningful conservation areas, identify where and why human-wildlife conflicts occur, design and undertake conservation efforts to curb or halt such conflicts, monitor program effectiveness, and adapt conservation efforts in light of these results. A suite of target species provides the backbone of the approach, and is identified based on criteria such as species’ area requirements, use of different habitats, vulnerability to multiple threats, socio-economic significance, and ecological functionality. This suite of species will be used in upcoming years to help define essential conservation lands and management priorities and assist the program in determining future conservation interventions.

We were initially scheduled to select Landscape Species in the fall and winter of 2004-2005. However, for several reasons we chose to delay the formal, participatory segment of the Landscape Species selection. First, the delay was necessary to address immediate threats to the Eastern Steppe and its wildlife, ranging from poorly planned development schemes such as the Millennium Road and Nomrog Bridge to the uncontrolled hunting of wildlife.. In addition, the change-over in staff in Mongolia made it impossible to perform a full-scale participatory Landscape Species selection during that time. Instead we have continued to collect and summarize important information specific to the biology of candidate species, both from our own field studies and from articles, books, symposia and conference reports, unpublished manuscripts, and other materials As well, connections continue to be forged with numerous local research institutes (among others, National University of Mongolia, National Academy of Sciences) and over 20 international organizations (among others, ICF, JICA, WI). We will solicit species experts within these groups to provide data for the selection in the winter of 2005-2006 through a full-scale Landscape Species selection process. In combination with data on the spatial distribution and severity of threats collected during threats assessment workshops and interviews (see Activity 1.2: Threat Assessment), data from the Landscape Species selection will enable us to define the extent of the landscape and locations in which conservation efforts should focus, as well as to identify priority actions in areas of critical conservation importance and conflict.

Activity 1.3.2. Develop a spatially explicit representation for threat abatement and landscape conservation

WCS has begun to incorporate available information within the framework provided by the Landscape Species Approach to design map-based biological and human landscapes. At this stage, in collaboration with Living Landscapes staff in New York, we have completed an assessment of the currently available spatial data that relate to habitat quality and the level of human activity within the landscape. In collaboration with Living Landscapes Program staff from New York, we have produced a metadata spreadsheet describing all of the spatial data included in the Eastern Steppe Biodiversity Project dataset, which includes over 700 individual data files, such as GIS files describing human land uses, natural vegetation cover, infrastructure, and species-specific distribution information. We have contacted several individuals to clarify methods used in the development of these data, dates of collection, sources, and other metadata for the existing data files. Living Landscapes Program staff from New York have incorporated several new datasets into the existing GIS database, such as topographic data for the entire steppe, documented information about new datasets in the metadata spreadsheet, and explored the availability and usefulness of different remote sensing data sources for the Eastern Steppe. We have also produced maps, run spatial analyses, and collected information on candidate Landscape Species. Several agencies and NGO’s expressed interest in our GIS data bases for

use in their planning, including some of the new data that WCS has been able to add (e.g., topographic data for Mongolia and satellite imagery). Therefore, we distributed the data and metadata on CD to interested government agencies (the National Remote Sensing Center and Mongolian Academy of Science) and NGOs (including the World Wildlife Fund and ESBP). We have also performed an assessment of the GIS and remote sensing capacity in the Mongolian natural resource sector covering 11 government agencies, NGOs, and private companies. We held an Eastern Steppe Vegetation Workshop to assess the quality of existing vegetation classification/land cover data sets for the steppe, and utility of these data for modeling habitat quality.

As with the Landscape Species Assessment, personnel changes in the WCS Mongolia office led to postponement of further planned analyses of threats and landscape-level issues related to conservation on the Eastern Steppe. Now that we have hired a new Program Director, we will interview and hire a GIS and Remote Sensing specialist over the next month. In addition to providing general GIS and Remote Sensing support for project conservation activities and the Landscape Species Approach, the specialist will create a centralized data base of GIS information for the Eastern Steppe, and help encourage increased collaboration among GIS producers and users in Mongolia (e.g., create a Mongolia GIS web page and list serve, organize a GIS conference, develop periodic meetings of a GIS user group). To this point, we have solicited and received several applications, all from native Mongolians, and plan to select a candidate by November 2005.

Activity 1.3.3. Focus conservation activities toward the Eastern Steppe Landscape Species

The Mongolian Gazelle

Research on the migration and ecology of the Mongolian gazelle continues as part of an ongoing program aimed at developing a sound management strategy for the Eastern Steppe. Our results show that the migration is not a true migration (in which predictable seasonal movements take place), but more closely resembles irregular nomadic movements in search of grasslands that offer the best grazing conditions at any particular time of year. With the highly variable climate in the Eastern grasslands, this means that the Mongolian gazelles movements are more complicated than previously thought and are more sensitive to disruptions in their ability to move across the steppe in search of suitable habitat. We have begun to investigate population genetics to determine if there are even genetically distinct populations. We continue to monitor the movements and distribution of Mongolian gazelles in order to refine our understandings of how and why gazelles show these types of movements. However, while we will continue to collect information to refine our understanding, we believe that we now have adequate data to begin serious efforts to design strategies and initiatives for gazelles that the Mongolian Government can use to sustainably manage this globally important population (see Appendix 5: Draft Action Plan).

The people living in the steppes use gazelles as a resource. From previous work we learned that the level of subsistence hunting is much greater than previously estimated, around 8 gazelle hunted per family or as many as 100,000 hunted by herding families alone - not including hunting from Aimag and Soum centers and border guards. The lack of complete range-wide population estimates makes determining whether this is sustainable or not difficult. Therefore we completed a range-wide driving survey during this reporting period, the most comprehensive survey ever conducted to date. This survey included approximately 5,000 km of transects and covered over 300,000 square km. These results will allow us to more accurately estimate sustainable hunting levels and represents the first ever systematic range-wide population survey for Mongolian gazelles.

In previous years, the Mongolian gazelles have been blamed for spreading disease to livestock with little or no research conducted to determine the efficacy of this hypothesis. With the help of the WCS Field Veterinarian Program, Dornod Aimag Veterinary Laboratory, and National Veterinary Laboratory, members of our team have initiated a livestock and gazelle disease and parasite monitoring program. The collection of these data encourages collaboration and provides opportunities for veterinarians to work more closely and to understand wildlife health issues of wildlife that share the pastures with domestic animals.

Our collaborative efforts have resulted in the addition of a new Ph.D. research program conducted by researchers from the Smithsonian Institute and University of Maryland. The focus of this work will be on understanding how gazelles perceive changes in pasture condition and what triggers them to move into other regions of the steppe. This will be combined with remote sensing of habitat to monitor regional trends in pasture condition. To date this work has been focused on development of a work plan and proposal preparation for external funding.

Our understanding of how gazelles live within and move across the steppe has grown considerably. Combined with conservation and education efforts, our efforts will continue to help move us forward in developing long-term conservation for one of the largest populations of wild ungulates in the world. This represents combined efforts by the Wildlife Conservation Society, National University of Mongolia, Smithsonian Institute, University of Massachusetts, University of Maryland, University of Idaho, Dornod Health and Veterinary Laboratory, National Health and Veterinary Laboratory, and Mongolian Academy of Sciences.

Survey: Using two vehicles, we conducted a range-wide driving survey from 14 May to 12 June, 2005. We totaled 513 hours driving 4,868 km over 230,000 sq km. Transects were separated by 30 and 60 km intervals and were between 55 and 330 kilometers in length. We sighted 1,088 herds totaling 142,412 animals. Average and median herd sizes were 131 and 11 while herd sizes ranged from 1 to 23,000. To provide a rough estimate of population size, a strip calculated by truncating the upper 0.15% of distances (2,194 meters) and a strip whose width included 0.50 of all observations (750 meters) was used and density calculated in the 230,000 square kilometer survey area. This returned numbers of between 1.56 and 2.9 million animals. However these numbers should not be used and are only provided to give a rough picture of the population size. Survey data will be analyzed this winter via Distance programming in order to provide accurate more figures.

Genetic analysis: 172 gazelle samples were shipped to the University of Idaho to investigate if there is any evidence of genetic differences between gazelles living within different regions of the steppe. We will also be sampling museum specimens from gazelles collected prior to the construction of the UB-Beijing railway to investigate the impacts this structure has had on gazelle population gene flow.

Disease and Parasite Monitoring: Beginning in March, WCS research biologist Odonkhoo initiated a 12-month livestock-gazelle monitoring program with funding from the WCS Field Vet Program. Fecal samples are being collected from sheep, goats, horses, cows, camels, and wild gazelle herds. These samples are being investigated for presence of helminth eggs. Fecal lab work is being carried out in the Dornod Aimag Health and Veterinary Laboratory. Results of this study will shed light on when parasite loads are heaviest in animals. Blood is drawn from domestic stock at the same time and serology tests will be conducted for presence of antibodies for viruses found in the region. At the time of this writing, the team was attempting to capture and collect samples from 30 Mongolian gazelle calves. Serology will be carried out at the Central Health and Veterinary Laboratory in Ulaanbaatar. This study will provide critical insight on disease transmission between livestock and gazelles needed to ameliorate the effects of disease. Furthermore, the study provides a means for ecosystem health capacity building in Mongolia for Mongolian students and veterinarians.

Working Group/International Conferences: As a result of the USAID/WCS-sponsored "International Mongolian Gazelle Conservation and Management Workshop" held in 2004, an international Mongolian Gazelle Working Group was formed. One of the first actions of this working group was to create a Mongolian Gazelle Symposium at the 9th Annual International Mammalogical Conference held in Sapporo, Japan on August, 2005. WCS presented two talks at this symposium: "Subsistence hunting of Mongolian gazelles, *Procapra gutturosa*, in Eastern Mongolia: Implications for sustainable management" and "Migration and habitat use of Mongolian gazelles in the Eastern Steppes of Mongolia." Probably the most important result of this working group is the collaborative dialog and data-sharing that is now occurring between the international participants, a far cry from the near-secrecy with which data was held previously. As well, a number of collaborative ventures are being explored by participants of this group, including the following proposal and publications.

Proposal development: An NSF proposal is currently in preparation entitled, "Resource Predictability and Dispersal Strategies in Ungulates: Does Temporal Uncertainty Lead to Nomadism in Mongolian Gazelles?" This research will have a three-year timetable and will incorporate GPS collars and remote sensing of resources throughout the steppes to determine the spatial distribution of high quality regions as time changes and among different regions of the steppe. Thomas Mueller is performing a two-week preliminary data-collecting trip to Dornod this summer.

Publications: The following publications have been developed and submitted by this project:

Olson, K.A., T.K. Fuller, G.B. Schaller, B. Lhagvasuren, and D. Odonkhoo. In Press. Reproduction, neonatal weights, and first-year survival of Mongolian gazelles (*Procapra gutturosa*). *Journal of Zoology*.

Olson, K.A., T.K. Fuller, G.B. Schaller, D. Odonkhoo, and M.G. Murray. In Press. Population density of Mongolian gazelles as estimated by driving long-distance transects. *Oryx*.

Olson, K.A., T. Muller, P. Leimgruber, G.B. Schaller, M.G. Murray, and T.K. Fuller. In Submission. Mapping seasonal habitat use of migrating Mongolian gazelle using satellite based biomass estimates. *Ecological Applications*.

Siberian Marmots

Siberian marmots are an important member of the Mongolian steppe ecosystem. Due to recent dramatic declines in marmot abundance, there is a 2-year country-wide hunting ban. WCS conducted line-transect and road surveys in the Eastern Steppe to establish baseline estimates of numbers both of marmots and active and inactive colonies. In addition, because marmots are considered a keystone species, detections of other wildlife such as raptors, wild ungulates and carnivores were also recorded. The 250,000 sq km study area encompassed the 3 eastern aimags of Khentii, Dornod, and Sukhbaatar in Mongolia. Surveys were conducted from June 10 to July 31, 2005. We completed 12 transects (3,148 km); 10 of which were north-south (1,966 km) and 2 of which were conducted from roads. One road survey was conducted in the most eastern part of the Dornod Aimag in the Nomrog Specially Protected Area and the other was conducted in the Khentii Aimag north of the Kherlen River. We also gathered data by conducting scan sampling in the evenings and mornings. In addition, habitat, topography, and the presence of humans and their livestock were also recorded.

Estimates of marmot and other wildlife densities will be calculated from line transects conducted during this survey. Data analytic software "DISTANCE" will be used to analyze line transect data. In order to present some preliminary findings of marmot, ungulate, raptor and carnivore detections on our transects, we calculated the number of detections per 1, 10 and 100 km of transect. (see Appendix 2 for methods). We believe our marmot population estimate if correct shows a much lower than expected number, and our density estimates were far lower than what have been published. Raptor numbers were the only ones that correlate with marmot detections. We will be refining our future analysis by using analytic software DISTANCE, and will use spatial analysis and logistic regression to model factors related to marmot and wildlife distribution.

The survey team has also produced a presentation on the survey and findings for the "Fifth International Conference on Genus Marmota" held in Tashkent, Uzbekistan, on 29-31 August, 2005, and will include its information in the upcoming "Marmot Action Plan and Survival Plan" that is expected to be a product from this conference.

Przewalski's Horse Reintroduction Feasibility Study

The Przewalski's horse (*Equus ferus przewalskii*), called *takhi* in Mongolian, became extinct in the wild and has only survived due to captive breeding. The last recorded sightings of takhi in the wild occurred in the 1960s in the Dzungarian Gobi of Mongolia. The reasons for the extinction of the takhi are seen in the combined effects of pasture competition with livestock and overhunting. Historical evidence suggests that takhi occurred in the Gobi as well as the Dornod steppe (Eastern Steppe) of Mongolia. In reaction to the extinction of the Przewalski's horse in the wild, the Food and Agricultural Organization (FAO) of the United Nations and the United Nations Environmental Program (UNEP) organized an expert consultation that passed a general resolution to reintroduce Przewalski's horses to their former range in Mongolia and China as the main method of recovery. Subsequently, a global management plan for Przewalski's horse reintroductions was proposed. Starting in 1992 takhis have been re-introduced in Central Mongolia (Hustain Nuruu) and in the Dzungarian Gobi (Takhin Tal). A third project started to re-introduce takhis in the depression of Great Lakes (Khomin Tal) in September 2004. The Eastern Steppe of Mongolia had also been considered previously for takhi re-introduction and in the 1980s an adaptation enclosure was built on the Russian side of the Daurian steppe. With the breakdown of the Soviet Union the project was abandoned and the requested horses from Askania Nova (Ukraine) were sent for re-introduction to Hustain Nuruu instead. All of the takhis used for reintroductions have been from European zoos – United States takhis have yet to be used for reintroduction efforts.

Recently the United States Przewalski's Horse TAG has expressed interest in becoming involved in takhi reintroduction efforts in Mongolia. As part of a preliminary investigation, in October 2004 WCS sent an international team to conduct a Przewalski's horse (takhi) reintroduction feasibility study of the Eastern Steppe. Sites assessed included Nomrog SPA and Mongol Dornod SPA. Team members included an international expert from the International Takhi Group and members of the National University of Mongolia. The team traveled across the steppe and visited both Strictly Protected Areas, and also interviewed Strictly Protected Area (SPA) staff and military personnel about the area and conditions critical for takhi re-introductions. Criteria were based on previous experiences from the re-introduction project in the Dzungarian gobi (Takhin Tal) and the criteria listed in the "Recommendations

for Mongolia's takhi strategy and plan." Assessment issues included size of reintroduction area, forage resources, water resources, human presence/ attitude/poaching; livestock, winter severity, predation, blood-sucking insects, other environmental risks, political situation/protected status, and development plans. A report was produced and is being prepared for printing in English and Mongolian for all interested stakeholders. Results included that, based on a suite of criteria, Nomrog SPA was an acceptable location for takhi reintroduction, should groups such as the US TAG wish to become involved.

In November WCS sent a powerpoint presentation on the Przewalski's horse (takhi) reintroduction feasibility study of the Eastern Steppe to a Przewalski's horse meeting in Front Royal, Virginia, USA, for consideration of the Eastern Steppe as a potential site in future US-led takhi reintroduction efforts

Other Potential Landscape Species

As wolves are a major species of both ecological and potential economic importance, WCS began preliminary work on wolves in the fall of 2005. WCS field staff captured and satellite-collared two wolves just north of Tsagaan Uul in Dornod Mongol SPA. These wolves were monitored to determine movements and behavior patterns as the first step in looking at wolf-gazelle-livestock interactions on the Eastern Steppe. Unfortunately, the area where the wolves were captured had large numbers of wolf hunters from UB and customs agents from Bichigt border point, driving in pairs and trios of SUVs looking for wolf packs. In three days in an extremely isolated region of the steppe, WCS staff saw 54 dead wolves (attached to jeeps) and 16 live wolves (two were caught). This suggests that wolves may be under considerable pressure from hunting pressure that may be unsustainable. A member of the WCS field staff is also working in Choibalsan to collect wolf samples from shot wolves for dietary analysis to determine frequency of predation on gazelles and livestock during the winter months.

The Program continues to investigate possible collaborative work with expert scientists and institutions on species considered under threat, including great bustards and cranes. What about the proposed GEF that we mentioned in the implementation plan?

OBJECTIVE 2: Develop and implement sustainable and adaptive mechanisms to strategically address threats across the landscape.

Activity 2.1. Establish necessary management mechanisms.

International Mongolian Gazelle Research Symposium/Management Workshop

On October 25-27, WCS and USAID, in collaboration with the Mongolian Academy of Sciences, the international Convention on Migratory Species (CMS), the UNDP-GEF Eastern Steppe Biodiversity Project, and WWF-Mongolia, held a three-day "International Workshop on Conservation and Management of the Mongolian Gazelle." Mongolian gazelles are the last great migratory herd of ungulates in Asia, rivaling the Serengeti wildebeest and Alaskan caribou in their size and importance. They also form a critical part of the economy of steppe herders, and may provide a commercial opportunity for Mongolia if managed correctly. Unfortunately, evidence suggests that Mongolian gazelles are decreasing in number. In Kazakhstan, saiga antelope were reduced from over a million animals to about 30,000 in only ten years, and there is the possibility that Mongolian gazelles may be facing a similar decline.

The main goal of the workshop was to create recommendations that will ensure long-term sustainable gazelle management. A total of 22 international experts from the US, Japan, UK, Belgium, China, and Russia participated, along with Mongolian scientific colleagues. Talks were presented to an audience of roughly 140 people consisting of government officials, resource managers, protected areas staff, NGOs, local community members, and other relevant stakeholders. The conference was split into two main sections. The first was a closed session (October 25) for scientists to go through a WCS-led priority setting and mapping exercise to identify research and conservation needs for Mongolian Gazelle conservation and management. After an overview of existing information by international experts, the second, open session (October 26-27) focused on how Mongolia (and its neighbors) might proceed with economic opportunities while ensuring sustainability of this unique steppe grassland ecosystem. The four main topics of the open session, addressed by break-out groups and plenary discussion, were:

- Enforcement (including specific needs, training, and finance mechanisms)
- Protected areas (e.g., altering or increasing boundaries or creating new PAs)

- Development and land use issues (roads, railroads, mining, and agriculture)
- Transboundary cooperation (including potential for transboundary PAs)

Outputs were a set of recommendations that together are forming the *Mongolian Gazelle Management and Action Plan*. Further outputs include specific recommendations to the Mongolian, Chinese, and Russian governments on international best-practice management of the gazelles; and a Memorandum of Understanding between Mongolia, China, and Russia outlining specific actions the three countries should take and methods of collaboration to ensure the conservation of the last of the great ungulate herds in Asia. Please see *Appendix 5, Draft Action Plan for the Mongolian Gazelle*, for an example of some of the planned initiatives for management.

Assessment of Wildlife Trade in Mongolia

Illegal and unsustainable hunting has become the major threat to wildlife in the last decade in Mongolia (see Appendix 4), and despite adequate available habitat, a number of wildlife species are rapidly being driven toward the brink of extinction. The recent increase in poaching in Mongolia stems from a combination of strong demand in Asian markets for wildlife products, combined with large numbers of people who are unemployed or struggling to make a living, and poor enforcement and lack of implementation of existing laws and policies on resource use, wildlife trade, and redistribution of trophy hunting revenues. Successfully addressing the unsustainable hunting problem will require a blend of public education programs; social development to provide alternative livelihoods for poachers; better regulation of commercial and trophy hunting including openness and transparency, external review and oversight; improved use of legal disincentives and incentives; reforming and vastly improving law enforcement; and the creation of some form of national wildlife agency. But such a program should also be linked to a social development plan that provides alternatives to poor people who turn to illegal practices to survive. Providing jobs in law enforcement is one example, but this approach should be even more comprehensive and enlist the assistance of people trained in these areas.

In order to address this threat to wildlife in Mongolia, WCS, with partial funding from the World Bank, developed a project to assess the wildlife trade issue in Mongolia. A project team was assembled and they identified a suite of information sources that would assist in determining wildlife trade types, volumes, values, and trends. These included direct observation and questioning in markets, random sampling of shops in urban areas, random sampling of individuals (hunters and consumers), and the collection and comparison of information from official sources and other conservation projects. Official sources included customs trade data from China, Mongolia and Russia; the Mongolian State Border Defense Agency enforcement record; the Professional Inspection Agency enforcement record; official hunting quotas issued by the Ministry of Environment, Aimag and Soum governments; CITES export records from the exporting authority at the Ministry of Nature and Environment; and historical records on hunting quotas and trade from whatever source available. Throughout the project, we were able to work well with the Mongolian customs authority and through them received some information from Russian and Chinese authorities. Cooperation with the Ministry of Nature and Environment and the State Border Defense Agency was positive. The project team developed field methodologies for surveying markets (market surveys) and individuals (household consumption surveys) involved in wildlife trade.

Market Surveys: Over 1,000 surveys were compiled from around Mongolia and all of them entered into the database for preliminary analysis. Market surveys targeted known markets that actively sell wildlife products and, through observation and direct questioning of shop owners, attempted to identify the types of species and products sold, purchase and sale prices, and quantities sold over time. In addition, we used the same market surveys to randomly sample markets in urban centers including tourism shops, grocery stores, and clothing stores. A slightly modified market survey form was developed to randomly sample restaurants in these same areas. Market surveys along the border region were also completed in China by two teams and in Russia by a separate project team.

Household Consumption Surveys: We completed slightly more than 4,000 household surveys in all 21 Aimags in Mongolia. Household consumption surveys were directed at individuals throughout the country and, through an approximately 20 minute interview, identified the types and quantities of species hunted, the quantities later sold to markets, and the amounts and types purchased by individuals at such markets. All data entry has been completed along with preliminary analyses.

The final report will be a revised assessment report including information collected and analyzed from the assessment of existing trade complemented by a pragmatic section reflecting the findings of the workshop (see next section

below), detailing the actions – by whom, when, how and at what cost (if any) – to improve the situation. Sections within the report are expected to include: history of wildlife trade in Mongolia; modern wildlife trade, including social and economic drivers for any changes that are perceived from the assessment; institutional aspects and regulatory structures for wildlife trade presently in place; case studies of specific species important to the trade, including distribution, legal status and conservation status worldwide and in Mongolia, and then an assessment of the trade for that species; and a comprehensive set of recommendations on how to improve management of the wildlife trade in Mongolia. The final report will be printed in Mongolian and English versions and the English version is expected to be completed by November 1, 2005.

International Workshop on Wildlife Trade in Mongolia

As part of the Wildlife Trade Study, a stakeholder workshop on Mongolian wildlife trade was held in Ulaanbaatar on August 17-19, 2005. Over 120 people attended the three day event, including staff from four ministries representing wildlife enforcement and management bodies in Mongolia, US Ambassador Pamela Slutz, TRAFFIC East Asia (Craig Kirkpatrick), interested national and international non-governmental organizations, hunting and tourism company representatives, resource specialists, and international experts. Beyond presentation of results of the survey described above, the conference provided input from biologists and management specialists for the participants to consider. Conference discussions focused on five management areas: international trade, domestic trade, hunting management and enforcement, trophy and sport hunting, and community-based approaches. Given the high level of interest, an extra day was added to the original schedule to allow for more discussion and drafting of recommendations by the participants. Attendance was high all three days with active and often animated discussions.

The major output from this workshop was the agreement that wildlife trade is having serious impacts not only on endangered species, but on several other species that occur in Mongolia; and that immediate measures are necessary to stop uncontrolled trade and prevent the potentially permanent loss of biodiversity. As a direct result of the conference, TRAFFIC East Asia is planning on conducting training with the Mongolian Customs Authority. Follow-up to the conference has already been completed by WCS in the form of an assessment of training needs for enforcement agencies in Mongolia's eastern steppe region (see below). WCS also attended the CITES conference in Urumchi, China where we presented the project's findings. The CITES Senior Scientific Officer (Tom de Meulanaer) attended this conference, and was briefed by the project leader upon his arrival in Mongolia prior to his discussions with the Ministry of Nature and Environment. CITES has already issued a letter to Mongolia closing saker falcon trade and will be looking closely at the need to do the same for other species. Mr. de Meulanaer also expressed interest in supporting Mongolia's listing in Appendix III other species of domestic concern that are traded internationally, e.g., Siberian marmot, Mongolian gazelle, etc.

A major report on the wildlife trade study and workshop is presently being written (see above). Other outputs from the workshop include numerous recommendations for improving domestic and international enforcement, monitoring, research, and community-based approaches to management. Information on the workshop has been published in several local newspapers, with an additional publication to appear in the New York Times. Three television networks aired reports on the conference both during and after the conference. The response by all parties simply can't be underscored enough. This study provided dimensions to what everyone already recognizes is a serious issue. Virtually all projects and government agencies are willing to cooperate in some way or another.

Prior to the conference, the project team was asked to present preliminary findings to the Rotary Club International, a special briefing of US Embassy personnel, and at the Asiatic Wild Ass Conference. Although unplanned, the project team took advantage of these opportunities to give as much information to as many interested parties as possible.

Nomrog Strictly Protected Area Field Surveys

Protected areas in Mongolia's Eastern Steppe support nationally and regionally important wildlife and wildlands. At the same time they serve as repositories of natural resources for future generations of Mongolians. The Nomrog Strictly Protected Area, established in 1992, is one of ten protected areas in this region, and is unique in that it lies at the biogeographical crossroads between Central Asian Steppe and Khyangan (Manchurian) Forest Steppe. Nomrog supports populations of a number of threatened or near-threatened birds and mammals, including Ussurian moose *Alces alces cameloides*, Eurasian otter *Lutra lutra*, Brown bear *Ursus arctos*, Red deer *Cervus elaphus*, Wild boar *Sus scrofa*, and Eurasian lynx *Felis lynx*. Specifically, this wildlife is threatened by hunting for local consumption, for domestic trade, and for cross-border trade with China. The wildlands which provide refuge for this wildlife are themselves threatened by illegal logging, unsustainable harvest of natural resources, and pollution of water sources.

Because of these threats, and the almost complete lack of knowledge of wildlife populations or trends, an international wildlife survey team traveled to Nomrog Strictly Protected Area (the farthest eastern corner of Mongolia) in September 2004 to perform a two-month survey of large mammals found in that park. The survey was completed in late November. Scientists from the US worked with and trained National University of Mongolia scientists and Protected Areas Agency staff in modern survey techniques. The focus was on moose, red deer, roe deer, and wild boar, but data were also collected on wolf, bear, lynx, and other important wildlife species. This is the only location on the Eastern Steppe where Mongolia's full suite of large mammals still exists, and virtually no research has been conducted in the park previous to this effort. Findings are relevant to management of the park, as well as to government plans to de-gazette part of the park and build a road and bridge through the area (see 'Bridge to Nowhere,' *The Economist*, January 29, 2004).

In November the US-led team gave a presentation in Choibalsan on their methods and findings to the Eastern Steppe Biodiversity Project, Eastern Steppe Protected Areas Administration, and the Environmental Inspection Agency for Dornod. The presentation was very well-received and led to a meeting between all of the agencies to discuss how to incorporate the data and methodology into future government survey work.

For a complete list of reports generated or in production over the last year, please see *Appendix 6: Project Reports to Assist in the Establishment of Necessary Management Mechanisms*

Activity 2.2. Enhance local capacity to implement the strategy.

Activity 2.2.1. Enhance Local Institutional Capacity.

As mentioned throughout this report, each activity from this project has a major focus on providing information to local institutions in the environmental sector to assist them in their management objectives. Activities include sponsoring workshops to provide information on locally collected data and international best practice and to develop management recommendations; workshops over the past year include one on Mongolian gazelle conservation and management, wildlife trade in Mongolia, and ecosystem health (as well as assisting on two other international workshops, one on Mongolian saiga antelope conservation and management and one on Gobi bear conservation and management). We have been active in producing reports on each of our initiatives, produced in both English and Mongolian; these reports are listed in section 2.1 above. We have also been active in direct training and mentoring of scientists and agency personnel across the environmental sector, ranging from the university system to the Academy of Sciences and various ministries and sub-agencies involved in resource management. Through these activities we are helping strengthen the capacity of local institutions to sustainably manage natural resources on the Eastern Steppe and across Mongolia, while simultaneously helping to produce the next generation of resource managers and scientists through our work with students.

Training Assessment of Nomrog Strictly Protected Area

As mentioned previously, Nomrog Strictly Protected Area is the only piece of Manchurian steppe found in Mongolia. It is also perhaps the last pristine portion of this unusual habitat remaining in the world, and features a number of CITES Red Book species (i.e., species considered rare and/or endangered) that could be further threatened as a result of development plans and unsustainable poaching. A proposed (illegal based on current Mongolian law) bridge and road infrastructure in the Strictly Protected Area is expected to lead to a great increase in poaching from the Chinese

side, where most species of economically valuable wildlife have already been almost completely wiped out. The infrastructure and transport plans would fragment habitat and lead to a decline in wildlife numbers due to easier access for poachers. Consequently, one of the top priorities for management of Nomrog SPA and other protected areas is to reduce wildlife crime by strengthening on-the-ground law enforcement and making it more effective.

The State Border Defense Agency (SDBA) plays an important dual role in the conservation of wildlife and wildlands in Nomrog SPA. This is firstly because border guards are stationed inside the reserve and are its only permanent residents. Therefore they are in a unique position to help reduce wildlife crime as part of their normal duties as border security staff. At the same time, SDBA staff are highly trained field staff who are well-suited to help train Protected Area Administration (PAA) rangers, State Inspectors and other government staff in practical enforcement techniques.

During August 2005, a national wildlife trade conference highlighted unsustainable hunting and trade, which represent the greatest threats to Mongolia's wildlife. A follow-up formal assessment was then conducted by WCS Asia Training and Capacity Development Director Dr. Anthony Lynam to review threats to Nomrog SPA and identify agencies responsible for enforcement, identify enforcement needs, and generate support from the agencies for a collaborative wildlife protection program. Meetings were held with Sumber SDBA officials and with the Sumber Governor, Soum and national level enforcement staff. These meetings confirmed the desire of government staff to work towards the conservation of wildlife and wildlands at Nomrog. At the same time, a number of gaps in enforcement capacity were identified, including lack of conservation training, apathy of some government staff towards wildlife, lack of resources, low numbers of enforcement personnel in the field, and the large areas inside the reserve which need patrolling and monitoring.

From this assessment, a proposal has been generated for a seven-day Wildlife Law Enforcement Training Workshop that would bring together SDBA and other enforcement agencies to learn the importance of wildlife and the important roles played by enforcement staff in conservation, and to foster sharing of information and collaboration among the agencies in working to reduce wildlife crime. The training workshop would prepare government staff for implementing a new wildlife protection strategy for Nomrog SPA by reducing cross-border incursions, habitat encroachment and poaching by Mongolian and foreign outsiders.

Activity 2.2.2. Enhance Local Community Capacity.

WCS has been active in developing connections with and collecting information from the local nomadic herder "communities" in the Eastern Steppe. We have used two large survey efforts, the Mongolian gazelle hunting survey and the threats assessment survey, as ways to make initial contacts. At the same time, we have tried to incorporate local herders and other community members into field efforts such as the Mongolian gazelle studies, which often include short-term local hires. This allows us to create two-way information sharing between our program and local herder knowledge, thus improving the design and focus of our interventions while simultaneously allowing us the opportunity to share data and results and help local herders better understand the threats to the steppe and their livelihoods and means to alleviate these threats and ensure sustainable use of this fragile land.

Because of the personnel change-over in staffing described earlier and the subsequent lack of on-ground capacity, this portion of the project was delayed. However, WCS staff has used the first two years to design an initiative that in Year Three will use socio-economic surveys, Participatory Rural Appraisal (PRA), stakeholder meetings and workshops, and pilot projects to develop management concepts that are appropriate to local challenges and opportunities, and to facilitate natural resource co-management agreements. We expect to work in collaboration with IPECON (The Initiative for People-Centered Conservation). The work will include providing recommendations and assistance on the creation of sustainable grazing practices and low-impact development schemes that can help alleviate poverty without damaging the ecosystem. Through this initiative, and by explicitly defining the connection between a local community's natural resource base and its cultural survival, we anticipate that communities will become more effective and proud stewards of their ecological landscape and the biodiversity found therein. The communities themselves will greatly enhance their abilities to maintain their cultural heritage through sustainable management of their resource base. Currently, funding restrictions are preventing us from implementing our plans to support local community capacity, as staffing and travel costs for PRAs in addition to costs for hosting workshops in remote areas of

the steppe are high (start-up costs of approximately \$40,000). In collaboration with WCS staff in New York, we are currently researching additional sources of co-funding to carry out this Activity.

Activity 2.2.3. Enhance Local Disease Management.

A range of diseases is endemic in livestock on the Eastern Steppe of Mongolia. Outbreaks of diseases such as foot and mouth threaten local livelihoods, the national economy, and even international trade. Danger also exists that such diseases could be transmitted to gazelles with catastrophic results to the population, as the recent (February 2004) outbreaks in southern Mongolia have proven. Already, gazelle have been blamed for spreading foot and mouth, and some officials have even called for the elimination of the large herds. However, it is unclear whether gazelles can be 'carriers,' as in most cases (such as with buffalo in Africa) carriers are not killed by the disease. Sound science needs to be brought to bear to elucidate potential disease relationships between livestock and gazelles. There is a critical need for science-based livestock and wildlife health policies and programs to minimize outbreaks, to put in place plans to reduce disease impacts on all sectors, and to pinpoint underlying factors contributing to health problems. It is also essential that a health monitoring program be initiated. Timely measures can prevent widespread animal death, and only good epidemiological monitoring of sentinel species like gazelles can help unravel the factors contributing to disease outbreaks or other ecological disturbances – including those with potential ramifications for people. A few of the many other diseases involved in the human-livestock-wildlife disease interface include brucellosis (spread by badgers) and plague (spread by marmots and ground squirrels).

Field Veterinary Assessment

In October 2004, the Program hosted Dr. Damien Joly from the WCS Field Vet Program and S. Enkhuvshin from the University of California Davis for a two-week informal survey of veterinary capacity in Ulaanbaatar and in Choibalsan (Dornod Aimag). This survey provided insight into capacity and training needs for the animal health sector in Mongolia, which informed both the USAID-funded Mongolian gazelle management planning exercise held in October, 2004 and the USAID/SANREM ecosystem health workshop in June, 2005. (A photo of workshop participants is attached to this report)

USAID SANREM Projects

In April of 2005, the Wildlife Conservation Society (WCS) along with two partners, Michigan State University (MSU) and the American Center for Mongolian Studies (ACMS), received a SANREM CRSP planning grant to explore the feasibility of an integrated and multidisciplinary approach to the interface between livestock, wildlife, and human health in Mongolia. We plan to focus research and training on the needs of the rural Mongolian sector, which in the post-Soviet era has largely been left on its own to organize systems of pasture allocation, natural disaster and disease outbreak response, land-dispute resolution, protected area management and the provision of basic services such as health care, education, veterinary assistance, biodiversity conservation and agricultural extension. We would facilitate an unprecedented level of involvement of the United States' Land Grant and Educational Community, the International Agricultural Research Centers (IARCs), and the Wildlife and Biodiversity Conservation Community in collaborative research efforts with local Mongolian partners to increase scientific knowledge and technical innovation in sustainable agriculture and natural resource management in Mongolia and the Central Asian region.

To date the following activities have occurred under this project:

U.S.-based planning meeting: Held at Michigan State University (MSU) on May 9-11, 2005. The itinerary and priorities for planning the long-term research and training program were discussed and agreed upon.

Mongolia-based planning activities: Co-PIs and key individual participants from WCS and MSU traveled to Mongolia in June to conduct the long-term research project planning activities with the assistance of ACMS.

Identification of USAID mission needs: Meetings were held with Leon Waskin, USAID Mongolia Representative, and Jeff Goodson, Senior USAID Program Manager on June 13th and June 30th, 2005. Importance of the proposed research to USAID strategic objectives in Mongolia were discussed and specific projects were identified.

Partnering Initiatives: Meetings with leaders of Mongolian academic institutions, research institutes and governmental and nongovernmental agencies involved in the livestock, wildlife and human health sector were held June 7th – 17th, 2005.

Participatory Workshop on Ecosystem Health: A 2-day workshop entitled *The Livestock, Wildlife, and Human Health Interface in Mongolia* was held on June 22-23, 2005. The concept of ecosystem health was presented to Mongolian counterparts with the goal of developing an integrated and multidisciplinary approach to the study of the interface between livestock, wildlife, and human health in Mongolia. Over sixty individuals from across the sectors of veterinary medicine, human health, and wildlife biology participated in the workshop. Outputs included agreements on major disease threats at the human, livestock, wildlife interface, research questions that need to be investigated to ensure proper management of these diseases in Mongolia, capacity needs across the sectors, and a suite of recommendations on how to move forward, including the creation of an ecosystem health working group and a list-serve to better communicate issues and ideas across the varied sectors involved in this issue. These outputs will be prepared as a stand-alone report for all stakeholders interested or involved in the issue of ecosystem health. Information from the participants also will be incorporated into the full long-term SANREM CRSP research and training project proposal.

Twenty six attendees (16 men, 10 women) completed an anonymous survey on the second day of the workshop. The majority of respondents listed their occupation as Medical/Public Health (10) or Veterinarian (12). Only 4 Wildlife Biologists responded. Half the respondents (13) indicated they worked for Government, 10 said they worked for a University or academic Research Center, 1 for the private sector, and 2 for Non-Governmental Organizations.

The final deliverable of the planning grant activities will be a full-length SANREM CRSP proposal for a collaborative research and training initiative in Mongolia. Longer term outcomes and the goals of this initiative are the following:

1. An integrated, landscape-based approach to health research and policy in Mongolia with an emphasis on understanding the epidemiology and ecology of key disease cycles in livestock, wildlife and human populations.
2. Young scientists and future leaders in the agricultural, environmental and health sectors in Mongolia trained in an integrative and multidisciplinary approach to the study of disease at the livestock/wildlife/human interface.
3. Adaptation of rangeland and natural resource management in ways that mitigate disease transmission and improve health at the livestock/wildlife/human interface.
4. Linkages between and among Mongolian students, scientists, and policy makers within the disease, agricultural and natural resource management fields and their counterparts in United States land grant institutions, international wildlife conservation organizations and IARCs. The advancement of an ecological approach to disease management in the fields of sustainable agriculture and natural resource management through collaborative research in Mongolia and the global dissemination of tested approaches through new and established networks.
5. Our workshop activities and discussions with stakeholders from the veterinary, wildlife and human health sectors identified several training and capacity needs in the Ecosystem Health field. In particular, training needs that were identified included: specialized diagnostic training; ecosystem health training (for veterinarians and epidemiologists); and training for herders. We propose to achieve the training objectives by providing:
 - Graduate-level training for two Mongolian students who will conduct their research in Mongolia and receive their training at Michigan State University;
 - Short-courses (3-weeks) designed to introduce and test concepts outlined in objective 2 for a larger group of interested students, scientists, wildlife and health practitioners;
 - A tri-national workshop “Ecosystem Health Beyond the Borders of Mongolia” designed to showcase lessons learned from the application of the Ecosystem Health approach in Mongolia (object 1 & 2) and to advocate the extension of this holistic approach to incorporating disease mitigation in sound natural resource management and sustainable agricultural practices.

Mongolian Gazelle Disease and Parasite Monitoring

As mentioned above, WCS has also initiated a livestock-gazelle monitoring program through our Mongolian gazelle project. Fecal samples are being collected from livestock and gazelles and are being investigated for presence of helminth eggs. Fecal lab work is being carried out in the Dornod Aimag Health and Veterinary Laboratory. Results of this study will shed light on when parasite loads are heaviest in animals. Blood is being drawn from domestic stock at the same time and serology tests will be conducted for presence of antibodies for viruses found in the region. Serology will be carried out at the Central Health and Veterinary Laboratory in Ulaanbaatar.

Avian Influenza

The Mongolian Ministry of Food and Agriculture presented an initial report of an avian influenza outbreak in Kovsgol Province near the Russian border, and conducted preliminary testing of birds that died at Erkhel Lake. Their finding coincided with confirmations of cases of avian influenza in Russia and Kazakhstan. The WCS Mongolia Program offered to assist the Mongolian Government in assessing the situation through their Field Veterinary Program. WCS field vets Drs. William Karesh and Martin Gilbert immediately traveled to the site (and to a number of other sites across the country) with a team of Mongolian virologists, veterinarians, and public health officials. The team included personnel from the Mongolian National Academy of Sciences, the Mongolian Institute of Veterinary Medicine, the State Central Veterinary Laboratory, Ministry of Food and Agriculture Veterinary Department, and the Ministry of Health Mongolian Center of Communicable Diseases with Natural Foci. The team collected samples from hundreds of wild birds, both live and dead, including ruddy shelduck, herring gull, black-headed gull, bar-headed goose, whooper swan, and Eurasian wigeon that are all at risk for contracting the virus.

Recent reports of influenza outbreaks in wild birds in China, Russia, and Kazakhstan have failed to put die-offs in perspective with the numbers of unaffected birds; thus there was no way to assess the actual impact of the disease. The WCS team at Erkhel Lake in Mongolia collected this information for the first time. Overall, over 6,500 apparently healthy birds of 55 species were observed on the lake. The percentage of sick or dead birds was miniscule according to Gilbert, suggesting that either the virus had little effect on the birds or that very few were actually infected by the virus. Early results suggest that it may be the latter.

Supported by the U.N.'s Food and Agriculture Organization (F.A.O.), the team has sent the samples (774 in total) to the U.S.D.A.'s Poultry Research Laboratory in Athens, Georgia, for further testing to determine whether this virus is the H5N1 strain that has killed over 50 people in Southeast Asia and more than 5,000 wild birds in western China. So far, preliminary tests from one dead whooper swan collected in Mongolia have shown the presence of the H5N1 strain of Avian Influenza using RT-PCR, while results from 30 live whooper swans living at the same site and also a nearby lake were negative for the virus. Samples collected from other live birds at the two sites, including sixty ruddy shelducks, twenty-four bar-headed geese, and twenty-five black-headed gulls, were found to be negative for the virus.

Whereas prior outbreaks in wild birds have happened either in close proximity to infected domestic poultry and waterfowl, or in regions where such contact could not be excluded, Mongolia's paucity of domestic poultry suggests a new vector of avian flu. Finding the H5N1 strain during this expedition suggests that while the highly pathogenic avian influenza can be carried across long distances, the waterfowl species typically identified in recent outbreaks appear to be victims rather than effective carriers of the disease.

In particular, five points were highlighted from this effort:

- 1) The H5N1 in migratory birds in Mongolia appears to have been self-limiting. The largest die-off appears to have occurred in Lake Erhel in Hovsgol Aimag with approximately 100 birds affected. Many more apparently healthy birds were observed on the lake. Another die-off with 8 birds affected in Khunt Lake of Bulgan aimag was reported before the Hovsgol event. No more migratory bird die-offs have been reported to date.
- 2) The very limited amount of domestic poultry production in Mongolia greatly reduces the risk of the spread of H5N1 in domestic birds and the subsequent transmission to people.
- 3) Measures aimed at depopulating wild birds in Mongolia should be strongly discouraged. There is no evidence that this will reduce disease transmission and is likely to cause stress and dispersal that would increase the risk of transmission.
- 4) Mongolia and surrounding countries should remain vigilant and continue surveillance and testing of any suspect cases.
- 5) The Mongolian authorities should be encouraged to continue their strong record of quickly reporting suspected outbreaks of disease to the international community.

The multidisciplinary, collaborative response to this latest outbreak reflects the WCS One World-One Health approach to making informed, multidisciplinary decisions on global health crises that intersect human, wildlife, and livestock health. WCS experts are warning that to contain this potential epidemic, prevention activities must include better management practices in farms, especially those that are small and open-air, where domestic poultry and waterfowl are

allowed to intermingle with wild birds. Officials would also need to monitor wildlife markets-where wild and domesticated species are kept in close proximity, and risk exposure to a wide range of pathogens. Wildlife and health experts, including the F.A.O., maintain that indiscriminate culling of wild migratory bird populations would be ineffective in preventing the spread of avian flu.

Activity 2.2.4. Enhance Local Scientific Capacity

WCS continues to focus on building capacity across the spectrum of Mongolian environmental sectors, from university students and professors to protected area agency personnel, veterinary staff, academy scientists, and non-government organizations. Long-term management of biodiversity on the steppe will depend as well on the emergence of a skilled and dedicated cadre of Mongolian scientists who can apply themselves to the problems of biodiversity conservation.

Field Training: The Mongolian gazelle project has employed three third-year university students to help with the data collection and to work alongside two other recent graduates. They are learning protocols for population estimation using Distance sampling and are learning how to use the program DISTANCE for data analysis. They helped prepare and identify parasite eggs with the Aimag vet center technicians and will also be learning techniques for capturing and handling newborn gazelles. Mongolian gazelle biologist Odonkhuu has received his Master's from the National University of Mongolia and was granted US\$1,000 from the 9th International Mammalogical Conference (IMC-9) to attend this year's conference in Sapporo, Japan where he presented a poster of his thesis work on calf activity patterns. Results of the gazelle project were also presented at the IMC-9 conference in Japan, and were first presented to the Eastern Steppe Protected Areas Administration, Dornod Aimag Environmental Inspection Agency, Dornod Environmental Monitoring Center, and the Eastern Steppe Protected Areas Administration staff.

WCS has also collaborated directly with Mongolian scientists on each of our field efforts to date (Siberian marmot survey, takhi reintroduction assessment, avian influenza survey). Each of these projects involve professors and students from the National University and/or other research institutions in Mongolia to help build international skills in project planning and methodology, data collection and analysis.

Scientific Publications: WCS has also worked with Mongolian professors, students, biologists, and government agency staff to build scientific writing skills and publish peer-reviewed articles on issues relevant to conservation on the Eastern Steppe. During the past year, a number of peer-reviewed publications have been co-authored and published/accepted/submitted for publication:

- Zahler P., Lhagvasuren B., Reading R.P., Wingard J.R., Amgalanbaatar S., Gombobaatar S., Barton N. and Y. Onon. 2004. Illegal and unsustainable wildlife hunting and trade in Mongolia. *Mongolian Journal of Biological Sciences*, 2(2): 23-31.
- Zahler P., Dolgormaa L., Hinds L., and A.T. Smith. 2004. The management of Brandt's vole in Mongolia: Toward an ecologically based means of control. *Mongolian Journal of Biological Sciences*, 2(2): 51-55.
- Heffernan D.E., Zahler P., Merkel J., Heffernan C.A., and J. Chinzorig. In Press. An assessment of the protected areas of the Eastern Steppe of Mongolia. *Mongolian Journal of Biological Sciences*..
- Olson, K.A., T.K. Fuller, G.B. Schaller, B. Lhagvasuren, and D. Odonkhuu. In Press. Reproduction, neonatal weights, and first-year survival of Mongolian gazelles (*Procapra gutturosa*). *Journal of Zoology*.
- Olson, K.A., T.K. Fuller, G.B. Schaller, D. Odonkhuu, and M.G. Murray. In Press. Population density of Mongolian gazelles as estimated by driving long-distance transects. *Oryx*.
- Zahler P. and B. Lhagvasuren. In Submission. Conservation and management of the Gobi bear. *Oryx*.
- Zahler P., S., Joly D., Osofsky S., Enkhtuvsin S. and L. Krueger. In Submission. Improving poverty alleviation and conservation outcomes in Mongolia. In: *Poverty, health and the environment: Improving knowledge to respond to the challenges in the Asia-Pacific region*. IUCN/ADB Publication, Bangkok, Thailand.

Other Activities to Enhance Scientific Capacity (complementary initiatives not funded by USAID)

Finally, due to the Project's continued efforts to develop sound connections and offer opportunities to enhance scientific capacity within the Mongolian conservation community, WCS was asked to contribute directly to two large initiatives related to conservation in Mongolia. Although outside of the scope of the Eastern Steppe project, we report on them here in order to show the level of respect with which the WCS program is held within Mongolia's environmental sector. Note that while we were asked to co-lead these workshops, no project funds were used.

International Mongolian Saiga Antelope Workshop: On October 30, 2004, WCS, in collaboration with, WWF-Mongolia, the Ministry of Nature and the Environment, and the International Convention on Migratory Species (CMS), held a workshop on "Current Status, Problems, Conservation Needs, and Management of Mongolian Saiga (*Saiga tatarica mongolica*)."

The Mongolian saiga is a critically endangered antelope and is the subspecies is endemic to Mongolia. The saiga faces numerous threats that are causing a large-scale population decline (recent estimates suggest a drop from over 5,000 to less than 800 over the last five years) such as poaching and habitat loss due to livestock grazing and environmental change. Poaching for the Chinese medicinal trade appears to be the most immediate threat. The present situation of the Mongolian saiga is alarming and requires intensive management and conservation activities at all levels to avoid losing this important member of Mongolia's natural heritage.

The main goal of the Workshop was to produce recommendations to ensure the survival of the last population of Mongolian saiga, including conservation and management activities and cooperation at the local, national, and international levels. The one-day workshop brought together representatives of Mongolian government and local area authorities, herders, rangers, biologists, and also antelope experts from around the world. During the workshop, discussions were held on the current status of saigas, problems that saigas face, what needs to be done to preserve the Mongolian saiga, and ways to implement conservation activities.

International Gobi Bear Conservation Workshop: On November 2-3, 2004, WCS, in collaboration with the Ministry of Nature and Environment and the UNDP/GEF Great Gobi Project, held an international workshop on "Conservation and Management of the Gobi Bear." The Gobi bear is one of the most critically endangered large mammals in the world. This small, pale bear is found only in the Gobi desert region of southwestern Mongolia. It lives in one of the most hostile regions on earth, where temperatures can vary by over 80° C during a single year. With scant vegetation, little food or cover, and virtually no water, the Gobi bear has managed to eke out a living in these barren hills in apparent isolation for thousands of years.

Although there are disagreements about the taxonomic status of the Gobi bear, it is universally agreed that the Gobi bear is severely threatened. It is listed as "very rare" in the Mongolian Red Book and is included as an Appendix I species (critically threatened with extinction) under the Convention on International Trade in Endangered Species (CITES), to which Mongolia is a signatory country. Population estimates vary by a factor of at least 2, ranging from less than 20 to 40 or more. The bears appear to face numerous threats, ranging from lack of food and water to inbreeding and fragmentation of the habitat of the few remaining breeding adults. The region where the bears are found is now a Strictly Protected Area (Great Gobi A SPA) but is also used by local people and their livestock, and the bears appear to face numerous human-induced threats ranging from overgrazing to lack of access to water sources to habitat destruction from illegal miners to direct persecution.

The lack of data about the Gobi bear and its potential threats, the critically low population and dismal forecasts for survival, the varied alternatives for conservation, and the social, political, and economic ramifications of various initiatives prove that there was a critical need for international best practice to inform conservation and management decisions about the Gobi bear, and there was consensus between the Mongolian Government and international organizations that there was a need to determine international best practice initiatives for Gobi bear conservation. The workshop convened experts in bear conservation and management from around the world including the US, Canada, and Europe, to analyze existing knowledge about the Gobi bear and determine how best to move forward to ensure its survival. A total of 75 participants were involved in the workshop, including national experts, Ministry of Nature and Environment personnel, NGO and park staff, and local environmental specialists. Minister Barsbold of the Ministry of Nature and Environment opened the workshop and urged participants to develop specific recommendations that could be enacted by the Government of Mongolia to conserve the Gobi bear.

Outputs from this workshop were a set of recommendations for policy and actions that will form the basis of a Gobi Bear Action Plan and that will become part of the Great Gobi A Strictly Protected Area Management Plan. Recommended actions included camera trap monitoring and satellite collaring to determine status, distribution, movements, habitat use, feeding ecology, and causes of mortality of remaining bears, working with local communities and border guards to increase knowledge about the Gobi bear and decrease disturbance and mortality, genetic analysis to determine the taxonomic status of the bear, and improvement of supplemental feeding stations to increase survivorship and breeding. Recommendations were submitted to the Ministry of Nature and Environment.

Activity 2.3. Implement mechanisms for measuring success and adapting the landscape strategy.

One of the most meaningful indicators of success is expected to be the population size of Mongolian gazelles. It is becoming increasingly evident that a sound management plan is needed that will ensure not only the survival of the species in as natural a state as possible but also that the use of this animal by local people is sustainable and based on the best available data. The first step in such a management plan is to determine the true numbers and trends in the population. However, previous research efforts have shown that Mongolia's vast steppe is too large to adequately survey using ground transportation – only an aerial survey can possibly cover the area needed and collect adequate data to develop a scientifically rigorous population estimate. This information can be used to protect the vast herds that exist today as well as the grasslands in which they roam for tomorrow. By doing so, Mongolian people will benefit from gazelle as both a utilizable natural resource and can take pride in being the steward of one of the world's greatest wildlife spectacles. In addition to population research cited in Activity 1.3.3, we have also arranged the use of an aircraft owned and operated by the husband of the US Ambassador to Mongolia to perform a systematic and statistically-based aerial population survey that would serve as an accurate baseline for setting initial off-take rates, monitoring changes in gazelle numbers, and mapping seasonal distribution. Initiation of the survey was expected in the fall of 2005, and the plane has finally arrived in country, but technical problems have led to the delay of the aerial survey until the spring of 2006.

Activity 2.4. Identify and strengthen constituencies for conservation at local, national and international levels to help ensure effective strategy implementation.

Because of personnel change-over in staffing described earlier and the subsequent lack of on-ground capacity, this portion of the project was delayed. However, we still plan to develop a community conservation education program designed to encourage two-way communication between steppe inhabitants and local government and to ensure that issues faced by steppe inhabitants are identified, collected and passed to relevant authorities and decision-makers.

WCS continues to identify scientists throughout the world who can collaborate on a variety of activities to create and strengthen constituencies for conservation. We have linked international Mongolian gazelle biologists to create a fully functional Working Group that is in regular email contact – this group consists of over 15 scientists from Japan, the USA, Europe, China, Russia, and Mongolia. Collaborative ventures on a variety of topics have already occurred or have been planned with a number of Russian and Chinese biologists and managers. We are working closely with a range of international and national NGOs on a variety of activities: for the wildlife trade study alone, we collaborated with over eight different international organizations. We have also helped to develop closer links between Mongolia and the organizations that administer international conventions: for example, we have arranged for visits and even co-funding from the Convention on Migratory Species (CMS), and we have arranged a visit and plans for provide funding and training by the Asia TRAFFIC representative in charge of CITES management.

OBJECTIVE 3: Learning and teaching best practices in the Mongolian Eastern Steppe landscape and beyond.

Activities 3.1. and 3.2. Evaluate tools and best practices for site-based conservation and synthesize lessons for dissemination to a wider conservation community; Review and assess emergent issues in global conservation.

The Eastern Steppe is one of a suite of WCS Living Landscapes that include grassland ecosystems, including Madidi (Bolivia), Rungwa/Ruaha (Tanzania), Patagonia (Argentina), and the Madison Valley (USA). In both the

Mongolian and Tanzanian Living Landscape, nomadic pastoralism is an important feature of the landscape. Assessing the value of the natural resources, mainly water and rangeland that are of critical importance to pastoralists and the wildlife that share their landscape, is a challenge facing both sites. A meeting was held in Rungwa Ruaha, Tanzania, in May of 2005 with representatives attending from all 12 Living Landscape sites around the world. At this week-long meeting, we identified more specific topics that we, as a team of collaborative sites, will pursue. The representatives from the LLP Mongolia and Tanzania sites agreed to assess rangeland and water valuation in the context of their individual programs.

Objective 4: New York Coordination Unit Strategy: Guide the design and testing of wildlife-focused planning, implementation, and evaluation tools for effective conservation at a landscape scale, and promote learning across sites and beyond

The NY-based Coordination Unit (CU) of the program is designed to develop and test wildlife-focused, landscape-scale approaches to biological conservation across multiple sites. To ensure the widespread utility of these new conservation approaches, the program is testing them within landscapes that encompass a diverse array of ecological characteristics, land-uses, resource-use issues, and jurisdictional arrangements. To develop new approaches, facilitate and harmonize testing and implementation among these core sites, and capture the synergistic benefits of diverse experiences, a central coordination unit is charged with designing and managing the program. This unit guides the development of landscape-scale conservation strategies, tools and techniques; assists in the design and development of cost-effective intervention and monitoring programs at these sites; promotes cross-site learning; and ensures communication among the sites, WCS staff (central and field), USAID (DC and missions), and the larger conservation community.

During FY 2005, the Coordination Unit accomplished most of its planned programmatic, technical, and administrative goals. The CU worked with field sites to design conservation landscapes for the Glover's Atoll, Maya Biosphere, and Madidi sites (design for the Eastern Steppe of Mongolia will be completed in FY06). CU staff refined and simplified the process for selecting landscape species, including development of software as a decision-support tool for analysis. The concept and rationale for using landscape species to focus conservation planning and monitoring at a landscape scale was disseminated to the conservation community through a peer-reviewed publication.

Activity 4.1 Provide technical assistance to site-based conservation

Members of the WCS/NY Coordination Unit worked closely with field sites to provide targeted technical input (help desk, and informal and formal training) throughout the year. In some cases this involved trips to sites as reported in the previous section of this report.

Activity 4.2 Design, implementation, and testing of decision support tools

Activity 4.2.1 Living Landscapes Program Technical Manuals

The Living Landscapes Program produced two new brief how-to guides, called Technical Manuals, after field testing and fine-tuning the methods at several WCS/BCLS field sites: one concerning participatory spatial assessments of human activities, and another one focusing on how to build conceptual models for a project. The manuals were also translated into French and Spanish, distributed to field staff, and made available on our website for wider use. We responded to requests from program staff of TNC, WWF and AWF and distributed copies of the threats assessment and conceptual modeling manuals, each of whom now have projects that have applied these techniques in the field. We have also made available our bulletins (brief conceptual guides on strategic approaches and tools) and technical manuals for the USAID Mission and Washington staff during their Agriculture, Environment and NRM training held in August 2005. These were enthusiastically received. In addition, we have written three additional manuals that are currently in review and will be published within the next few months. The three draft manuals are: Developing a monitoring framework from conceptual models; Building biological and human landscapes; and conducting household surveys. Enthusiastic uptake of the LLP bulletins and manuals continues to demonstrate the utility of the lessons we are learning under BCLS and are sharing with the larger conservation community.

Activity 4.2.2 Landscape Species Approach progress

4.2.2.1 Landscape Species Selection Software

Revisions to the landscape species selection software were completed, and version 2.0 was released and distributed to BCLS sites, other WCS sites, and conservation practitioners at large. The new version includes refinements of criteria used to rank candidate species for selection (e.g., heterogeneity of habitat use), provides more user-control of selection criteria, and includes an overhaul of the process of selecting species to maximize their complementarity.

4.2.2.2 Conservation Landscapes

As one of the priorities for this year, LLP staff worked closely with sites to design conservation landscapes that map conservation priorities within larger, undefined landscapes. During the last Living Landscapes Program Annual meeting, presentations were given from 7 sites where staff have conducted a preliminary round of designing conservation landscapes (Ndoki-Likouala (Congo); Madidi (Bolivia); Northern Plains (Cambodia); Adirondack Mts (NY-USA); Glover's Reef (Belize); Madison R. Valley (MT-USA); and Maya (Guatemala). For each, identification of priority areas within the landscape was based on: (1) spatially-explicit needs of selected landscape species (biological landscapes), and (2) mapped threats (human landscapes). Analytical methods for determining a set of priority lands that are sufficient for long-term conservation, while efficiently addressing threats, were described using several different methods, including MARXAN and C-Plan software. We were therefore able to compare such methods, and will be applying these to further landscape designs. Decisions were also made on population target levels that should be incorporated into final analyses, aiming at a minimum for populations that are demographically sustainable. Plans for finalization of conservation landscapes have been outlined for each of the 7 sites over the following year.

4.2.2.3 Testing the landscape species approach

Ad hoc assessments to-date have informed us that field projects use the Landscape Species Approach (LSA) tools with some variation, depending on the circumstances at different sites. Some have dedicated a great amount of time to landscape species selection and have done threats assessment with wide participation, while others have carried out both these exercises within a relatively short amount of time and with a handful of project staff. We would like to be able to draw some principles from these variations and be able to advise others on the utility of the approach, its individual steps, and the conditions under which it may or may not provide advantages to conservation.

With this in mind, LLP has engaged non-LLP WCS staff to work with us (both field-based and central) in reviewing the use of LSA at twelve sites that constitute the core LLP portfolio (including all BCLS/GCP sites – both past and present), and in assessing users' and other WCS' staff perception of its utility for site based conservation. The assessment will mainly be questionnaire based with some follow-up interviews with field staff. LLP intends to use the findings to better adapt our program and LSA tools for site-based planning. This assessment has begun, and will be completed in the first half of FY06.

Activity 4.3 Catalyze cross-site and cross-organizational learning, and communication

Activity 4.3.1 Living Landscapes Program Annual Meeting

The Fourth Annual Meeting of the Wildlife Conservation Society's Living Landscapes Program (LLP) took place from May 24- June 1, 2005 in Ruaha River Lodge, Ruaha National Park, Tanzania. A total of twenty-five WCS field and New York-based staff attended the meeting, including representatives of all but one of the BCLS/GCP-funded sites² and from other WCS regional programs (Marine and Africa). Participants spent five days in a formal meeting setting and one day on a project field trip. In addition to continued group work on LSA tools, the group spent significant time discussing field topics identified both prior to and during the meeting. Topics included those centering on local socio-economic contexts (community-based wildlife management, addressing socially diverse landscapes, economic incentives as conservation tools, measuring the impact of outreach efforts), power & governance issues (dealing with

² The following BCLS/GCP sites were represented: Ndoki-Likouala (Congo); Yasuni (Ecuador); Eastern Steppe (Mongolia); Glover's Reef (Belize); Maya (Guatemala). Madidi (Bolivia) was not represented due to insecurity problems in Bolivia prior and during the meeting.

national political instability, analysis of stakeholder power relationships), zoning as a conservation tool, and economic valuation of natural resources/wildlife. In addition to sharing experiences, ideas and perspectives on each topic, we agreed to distribute contacts and/or relevant literature as a follow-up to many of the discussions. Particular interest was raised in conducting stakeholder power analyses and economic valuation of ecological goods and services, and possibly undertaking direct payments to communities for conservation compliance. Report of the meeting has been distributed to meeting participants, and is available upon request.

Activity 4.3.2 CMP: leadership, design, writing and audits

David Wilkie and Craig Groves continued to represent WCS within the Conservation Measures Partnership. Groves and Wilkie contributed directly to the analysis of lessons learned during the pilot audits conducted in FY04-05 and are currently helping to draft a protocol for conducting multi-partner peer-reviews of conservation projects. Wilkie worked closely with other CMP partners to assess the feasibility of developing software to guide field staff through the steps in the 'Open Standards' for conservation planning and adaptive management. This CMP activity resulted in development of a business plan for software development. Wilkie and Groves will continue to provide technical guidance as tool modules are developed for the Adaptive Management software. The eAdaptive Management software is an attempt to integrate best-practices of conservation planning into a simple to use software package. The software will guide practitioners through the steps in effective planning and project adaptive management and provide a system for tracking conservation progress over time. WCS staff worked with TNC to ensure that our institution process for cataloging our field projects is compatible with the TNC Project Inventory website. In the next 3 months, WCS will complete a review of WCS efforts to implement activity-based cost accounting within the Gabon and Bolivia programs. This review is eagerly anticipated by a number of donors, including the USAID Congo Basin Forest Partnership program.

Activity 4.3.3 Cross-organizational Learning Initiative

At the beginning of September, the Landscape Ecologist and socio-economic monitoring specialist participated in a multi-partner workshop organized by WWF on Landscape Planning. They presented the Landscape Species Approach and participated in the process of applying different landscape planning tools, used by the different NGO partners, to the Samburu Heartland in East Africa.

4.3.4 Synthesis of Lessons from site-based conservation

4.3.4.1 Local engagement in conservation survey

After testing the survey design for the study on engaging local people to promote effective conservation of wildlife and wildplaces, the survey instrument was refined and finalized. Completion of the survey has been postponed for late 2005, and will be completed during the first quarter of 2006. Analysis of the survey results will be compiled and written up for publication in a peer-reviewed journal and as an LLP bulletin that outlines a set of guiding principles for engaging local people in conservation.

4.3.4.2 Survey of "protection" as a conservation strategy at sites

The WCS Maya Biosphere Reserve Project conducted the survey of protection measures used by a number of WCS sites. However, response rates were limited, and due to other pressures at the project site, the finalization of the survey results analysis has been postponed until FY06.

4.3.4.3 Preliminary assessment of the human welfare impacts of establishing national parks (Parks and People project)

With funding provided by the John D. and Catherine T. MacArthur Foundation, LLP staff in collaboration with the WCS Gabon program and the Ministry of Forest Economy in Gabon conducted a baseline household welfare survey of 1,000 households living close to the borders of 4 national parks in Gabon, and an additional 1,000 control households living outside the influence of the parks. This survey is the first of three surveys planned over the next 5 years to assess the income, health, consumption, natural resource use, and family function impacts of establishing protected areas on local families. Results of the baseline survey will be analyzed within FY06 and will allow us to assess the role that market access plays in the welfare status of families proximal to and distant from the parks. Additional funds were secured from the National Science Foundation to support the Gabonese social science teams working on the Parks and People Project, and to assess the role that individual time preference (discount rates or patience) plays in

investment in health care, education, savings, and sustainable use of natural resources. An article on the Parks and People project was accepted for publication in *Conservation Biology*.

Activity 4.4 Application of Living Landscapes Program tools beyond core sites

4.4.1 Training workshops in the use of LLP tools

Staff conducted a number of workshops to train field practitioners in the use of conservation planning tools throughout the year. In addition to holding in-service WCS training workshops on building conceptual models for conservation projects and using these as the foundation for monitoring conservation success, staff held such workshops for project partners in Madagascar (May 2005) and Gabon (March 2005).

In response to increasing demand for training in the conservation tools, the socio-economic monitoring specialist also ran a training of trainers workshop for WCS directors and program managers in August 2005. As demand for training opportunities exceeds the staff time available in LLP, we envision that participants from these workshops will in turn train and work with field staff and partners in different parts of the world. Such staff will be able to follow up with post-workshop support to interested partners, e.g., protected area staff in Madagascar and Gabon.

4.4.2 The World Conservation Congress

As part of the World Conservation Congress in Bangkok, Thailand in November 2004, the program director led a symposium titled “Applying Ecosystem Management for Biodiversity Conservation: A Wildlife-focused Approach”. The aim of the symposium was to draw out principles and, using case studies, outline the utility of wildlife-focused strategies and management that are integrated within complex environments of human influence. Emphasis was placed on current work from active conservation initiatives, and included a case-study presentation from the Madidi, Bolivia project – a USAID/EGAT funded project. The workshop was well-attended, and highlighted the value of wildlife targets for landscape-scale conservation planning and management.

Activity 4.5 Ensure coordination and communication services for the program

LLP Coordination Unit staff periodically met with staff from the core sites and other WCS large-scale conservation sites to discuss the development of the program, on-the-ground implementation of the Landscape Species Approach, and further development of tools relevant to the approach. The Outreach Coordinator and others continued to meet with collaborators, NGOs, governmental officers, and representatives of other stakeholder groups to promote use of BCLS-derived strategies and tools, to assess their utility, and to determine whether additional tools would be of use to field practitioners.

CU staff worked with field staff in the preparation and review of annual reports and implementation plans. The CU staff also organized the annual GCP meeting in May 2005 where we presented the Landscape Species Approach and project cycle used by WCS. We feel that this was a particularly focused and useful GCP meeting.

Appendices:

Appendix 1: SANREM Planning Grant Activities and Attendees

Appendix 2: Partial List of Participants at the “International Conference/Symposium on the Conservation and Management of the Mongolian Gazelle”

Appendix 3: Preliminary Data from the Siberian Marmot (*Marmota sibirica*) Survey on the Eastern Steppe of Mongolia

Appendix 4: Information from Preliminary Assessment of Wildlife Hunting and Trade in Mongolia

Appendix 5: Draft Action Plan for the Mongolian Gazelle

Appendix 6: Project Reports to Assist in the Establishment of Necessary Management Mechanisms

Appendix 1: SANREM Planning Grant Activities and Attendees

Attendance at the U.S.- based planning meeting at Michigan State University May 9-11, 2005

Michigan State University (MSU): Amanda Fine, Jean Tsao, Graham Hickling, John Kaneene, Ann Winters, Mary Ann Walker, and Kathy Hull

Wildlife Conservation Society (WCS): Damien Joly and Josh Ginsberg; by video conferencing: Enkhtuvshin Shiilegdamba and Steve Osofsky

American Center for Mongolian Studies (ACMS): Charles Krusekopf

Co-PIs and key individual participants from MSU, the Wildlife Conservation Society (WCS) and the American Center for Mongolian Studies (ACMS) involved in Mongolia-based planning activities

Michigan State University (MSU): Amanda Fine, Jean Tsao, Graham Hickling, Ann Winters,

Wildlife Conservation Society (WCS): Damien Joly, Peter Zahler, Enkhtuvshin Shiilegdamba

American Center for Mongolian Studies (ACMS): Peter Marsh and Enkhbaatar

Identification of synergies with USAID strategic objectives in Mongolia and specific on-going projects

Gobi Regional Economic Growth Initiative: A Mercy Corps rural economic development project funded by USAID. Met with Steve Zimmerman (Country Director), Sean Granville-Ross (Deputy Chief of Party) and Dan Schar (Henry Luce Scholar). Links to their rural veterinary and herder assistance programs discussed.

Economic Policy Reform and Competitiveness Project: A Chemonics project funded by USAID. Met with Bruce Harris (Senior Business Development Advisor). Possible links to efforts in the area of improving Mongolia's competitiveness in meat and livestock product export.

Gobi Forage: A Livestock CRSP lead by Texas A&M to test a "Livestock Early Warning System" in Mongolia. Met with local Gobi Forage staff and had e-mail contact with Jerry Stuth and Doug Tollesen from Texas A&M. Possibility of including livestock/wildlife disease data in current GIS-based early warning system.

Individual meetings held July 7-17, 2005, with representatives of Mongolian academic institutions, research institutes and governmental and nongovernmental agencies involved in the livestock, wildlife and human health sector

1. Clyde Goulden Hovsgol GEF/WB Project, Philadelphia Academy of Sciences
2. B. Mendsaikhan Hovsgol GEF/WB Project
3. Ch. Tungalag School of Veterinary Medicine, Mongolian Agricultural University
4. Steve Zimmerman Country Director-Mongolia, Mercy Corps
5. Sean Granville-Ross Deputy Chief of Party, Mercy Corps
6. Dan Schar Luce Scholar, Gobi Regional Economic Growth Initiative
7. Leon Waskin USAID Representative, Mongolia
8. Jeff Goodson Senior USAID Program Manager, Mongolia
9. R. Sodnomdarjaa President, Mongolian Veterinary Medical Association and Chief, State Central Veterinary Laboratory
10. Y. Zagdsurgen General Manager, Research Institute of Animal Husbandry, Mongolian Agricultural University
11. D. Orgil Director of Veterinary Department, Ministry of Food and Agriculture
12. P. Dorjsuren Chief Epidemiologist, Veterinary Department, Ministry of Food and Agriculture
13. Altangeral Epidemiologist, Veterinary Department, Ministry of Food and Agriculture
14. Bolortuya Epidemiologist, Veterinary Department, Ministry of Food and Agriculture

15. Jargal Wildlife Biologist, Steppe Forward Program, National University
16. Gana Wildlife Biologist, Argali Project, Montana State University
17. Amaglanbaatar Wildlife Biologist, Biology Institute, Academy of Sciences
18. Jim Wingard Environmental Law Consultant, WCS Wildlife Trade Study
19. Chinge Mongolia Country Director, World Wildlife Fund
20. T. Altantsetseg General Director, National Center for Communicable Diseases, Ministry of Health
21. S. Weinhold Counselor for Public Affairs, Embassy of the United States of America
22. Y. Otgon Program Assistant, Embassy of the United States of America
23. D. Otgonbaatar General Director, Center of Infectious Diseases of Natural Foci, Ministry of Health
24. D. Tserennorov Deputy Director, Center of Infectious Diseases of Natural Foci, Ministry of Health
25. Agiimaa Deputy Director, Center of Infectious Diseases of Natural Foci, Ministry of Health
26. Undraa Project Manager, Deputy Director, Center of Infectious Diseases of Natural Foci, Ministry of Health
27. Chris Walzer Research Institute of Wildlife Ecology, University of Veterinary Medicine, Vienna
28. M. Altankhuu Deputy Director, National Center for Communicable Disease Control and Research, Ministry of Health of Mongolia
29. J. Erdenebaatar Senior Researcher, Institute of Veterinary Medicine
30. Z. Batusukh Scientific Secretary, Institute of Veterinary Medicine
31. A. Yondondorg Senior Researcher, Institute of Veterinary Medicine
32. G. Battsetseg Senior Researcher, Institute of Veterinary Medicine
33. Bayartsogt Rural Development Officer, World Bank, Mongolia
34. Kirk Olson Gazelle Biologist, Wildlife Conservation Society
35. Cliff Montagne Professor of Land Resources and Environmental Sciences, Montana State University

Participants at *The Livestock, Wildlife, and Human Health Interface in Mongolia* Participatory Workshop held on June 22-23, 2005.

1. Ariunsanaa Department of Microbiology and Immunology, National Medical University
2. Tserennorov Endemic Infectious Disease Center
3. Dan Schar Gobi Regional Economic Growth Initiative
4. A. Yondondorj Institute of Veterinary Medicine
5. Erdenebaatar Institute of Veterinary Medicine
6. G. Battsetseg Institute of Veterinary Medicine
7. Purevsuren Institute of Veterinary Medicine
8. Z. Batsukh Institute of Veterinary Medicine
9. Borgil Ministry of Nature and Environment
10. B. Battur Plant Protection and Research Institute
11. Y. Zagsuren Research Institute of Animal Husbandry
12. Ch. Tungalag School of Biotechnology and Veterinary Medicine
13. B. Sugar State Diagnostic Veterinary Laboratory
14. G. Yura State Diagnostic Veterinary Laboratory, (SCVL)
15. Sodnomdarjaa State Diagnostic Veterinary Laboratory
16. Nansalma State Diagnostic Veterinary Laboratory
17. T. Altantsetseg National Center for Communicable Diseases
18. Altankhuu National Center for Communicable Diseases
19. Tsetsegmaa National Center for Communicable Diseases

20. Navchaa	National Center for Communicable Diseases
21. Zulhuu	Department of Microbiology and Immunology, National Medical University
22. Altangerel.Kh	State Veterinary Services, Ministry of Food and Agriculture
23. Bolortuya	State Veterinary Services, Ministry of Food and Agriculture
24. D. Orgil	State Veterinary Services, Ministry of Food and Agriculture
25. Altansukh	School of Veterinary Medicine and Biotechnology
26. Suvd	Public Health Institute
27. Dolgormaa. L.	World Wildlife Fund
28. Amaglanbaatar	Biology Institute, Academy of Sciences
29. D. Tserennorov	Center of Infectious Diseases with Natural Foci
30. D. Otgonbaatar	Center of Infectious Diseases with Natural Foci
31. Sh. Agiimaa	Center of Infectious Diseases with Natural Foci
32. Undraa	Center of Infectious Diseases with Natural Foci
33. D.Turbat	National Emergency Management Agency
34. Oyundari	Ministry of Nature and Environment
35. Adia	Institute of Biology, Mongolian Academy of Sciences
36. Bruce Harris	Economic Policy Reform and Competitiveness Project
37. Scott Weinhold	U.S. Embassy
38. Amanda Fine	Michigan State University
39. Jean Tsao	Michigan State University
40. Graham Hickling	Michigan State University
41. Ann Winters	Michigan State University
42. Damien Joly	Wildlife Conservation Society
43. Peter Zahler	Wildlife Conservation Society
44. J. Chinzorig	Wildlife Conservation Society
45. Enkhtuvshin	University of California - Wildlife Conservation Society
46. Enkhbaatar	American Center for Mongolian Studies
47. Peter Marsh	American Center for Mongolian Studies

Appendix 2: Partial List of Participants at the “International Conference/Symposium on the Conservation and Management of the Mongolian Gazelle”

International Participants:

George Schaller	Wildlife Conservation Society, USA
Eric Sanderson	Wildlife Conservation Society, USA
Peter Zahler	Wildlife Conservation Society, USA
Kirk Olson	Wildlife Conservation Society, USA
Aili Kang	Wildlife Conservation Society-China
Zhigang Jiang	Chinese Academy of Sciences, Beijing
Badamjavın Lhagvasuren	Mongolian Academy of Sciences, Ulaanbaatar
Odonkhuu Daria	National University of Mongolia, Ulaanbaatar
Vadim Kiriliuk	WWF-Russia, Daursky State Biosphere Reserve
Aleksey Cherepitsin	Daursky State Biosphere Reserve, Chita, Russia
Anna Lushchekina	Russian Academy of Sciences, Moscow
Ilya Dmitriev	Russian Academy of Sciences, Moscow
E.J. Milner-Gulland	Imperial College, London, UK
Aline Kuhl	Imperial College, London, UK
Julian Derry	University of Edinburgh, UK
Ito Takehiko	Tottori University, Japan
Seiki Takatsuki	University of Tokyo, Japan
Roseline Beudels	Convention on Migratory Species, Belgium
Thomas Mueller	National Zoological Park, Washington, USA
Todd Fuller	University of Massachusetts Amherst, USA

Mongolian Parliament:

Ch.Radnaa	Head, Environmental and Rural Development Standing Committee
D.Odbayar	Member of Parliament
Ts.Bayarsaikhan	Member of Parliament
S.Bayartsogt	Member of Parliament
D.Myagmarsuren	Advisor, Environmental and Rural Development Standing Committee

Government:

U.Barsbold	Minister, Ministry of Nature and Environment (MNE)
Dr. Ya.Adiya	State Secretary, MNE
Ts.Damdin	Head, Department of Policy Implementation and Coordination, MNE
N.Oyundari	Head, Department of International Cooperation, MNE
B.Dorjgotov	Officer, Department of Policy Implementation and Coordination, MNE
G.Ganzorigt	Officer, Department of Policy Implementation and Coordination, MNE
Batgerel	Officer, SPA Management Division, MNE

Terbishdagva	Minister, Ministry of Food and Agriculture (MFA)
Nergui	Head, Department of Policy Implementation and Coordination, MFA
P.Bolortuya	Veterinary Specialist, State Veterinary & Animal Breeding Department, MFA
Dr.Battur	Director, Plant Protection Research Institute, MFA
Dr.Davaanyam	Researcher, Plant Protection Research Institute, MFA

Colonel D.Baatar,	Director, Border Guard General Administration
Colonel A.Baatartsogt	Deputy Director, BGGA

Ts.Banzragch	Director, Inspection Department, State Inspection Administration
Ya.Ariunzul	Head, Environment and Geodesy and Cartography Inspection Department, SIA
Kh.Badam	State Senior Inspector, Inspection Department, SIA

Mongolian Academy of Sciences:

Academician T.Galbaatar	Vice-President, MAS
Academician Ts.Janchiv	Director, Institute of Biology, MAS
Dr.B.Lhagvasuren	Head, Mammalian Ecology Laboratory, IB, MAS
Dr.L.Amgalan	Scientific Secretary, IB, MAS
Dr.S.Dulamtseren	Adviser, MEL, IB, MAS
Dr. D.Tsendjav	Senior Scientist, MEL, IB, MAS
B.Chimiddorj	Scientist, MEL, IB, MAS
B.Buuveibaatar	Scientist, MEL, IB, MAS
S.Amgalanbaatar	Scientist, MEL, IB, MAS
G.Sukhchuluun	Scientist, MEL, IB, MAS
Ts.Munkhzul	Scientist, MEL, IB, MAS
Yad. Adiya	Scientist, MEL, IB, MAS
B.Munkhtsog	Scientist, MEL, IB, MAS
Ch.Dugarjav	Director, Institute of Botany, MAS
L.Jargalsaikhan	Scientist, Institute of Botany, MAS
Dr. Oyungerel	Institute of Geography, MAS

Convention on Migratory Species (CMS-Bonn Convention):

Mr. Ts.Damdin	Focal Point for Mongolia, CMS
Dr. B.Lhagvasuren	Scientific Councillor for Mongolia, CMS

Universities:

R.Samiya	Vice-President, National University of Mongolia
N.Batsaikhan	Biologist, NUM

Protected Area Administrations :

Enkhbuir	Director, Eastern Mongolia PAA, Dornod aimag
Tserenbaltav	EMPAA
B.Delgermaa	EMPAA
J.Ulziitumur	Ranger, EMPAA
L.Myagmarsuren	Ranger, EMPAA
Altangerel	Director, Gobigurvansaikhan PAA, Umnugobi aimag
Shar – Baruunsaikhan	Mountain Ranger, Gobigurvansaikhan PAA, Umnugobi aimag
Yu.Suvdchimeg	Director, Khar-Us Lake Strictly PAA, Khovd aimag
Banzragch	Khomin Tal Buffer Zone Ranger, KhULSPAA, Khovd aimag
N. Bandi	Director, Khustai National Park
Ts. Sukhtulga	Vice-Director, Khustai NP

Local Governments:

Sh.Ganbat	Head, Environmental Protection Agency, Dornod aimag
Enkhtuya	Officer, Aimag Inspection Department
Borgil	Head, Environmental Protection Agency, Sukhbaatar aimag
Shaaluu	Governor, Sukhbaatar Soum
I.Davaanyambuu	Head, Environmental Protection Agency, Tuv aimag
D.Suren	Head, Environmental Protection Agency, Dornogobi aimag
Dolgorsuren	Head, Environmental Protection Agency, Khentii aimag
G.Erdenetugs	Head, Department of Strategy and Policy Implementation and Coordination
Myagmarjav	Head, Environmental Protection Agency, Dundgobi aimag
D.Baraaduuz	Environmental Protection Agency, Umnugobi aimag

NGOs:

J.Chimeg	Director, WWF-Mongolia Program
Batnasan	Officer, WWF-Mongolia Program
Yo.Onon	Officer, WWF-Mongolia Program
Odonchimeg	Coordinator, Eastern Steppe Biodiversity Programme, UNDP
N.Batjargal	National Project Manager, Sustainable Grassland Management Project, UNDP

Volunteers:

Delkhiitsetseg	ESBP volunteer, Sukhbaatar aimag
Ulziiduuren	ESBP volunteer, Dornod aimag
Jason Merckle	Peace Corps environmental volunteer, Dornod PAA
David Heffernan	Peace Corps environmental volunteer, MNE

Media:

“Daily News”
“Unuudur”
“Baigali” newspaper
“UB POST”
Mongolian National TV
TV5
TV9
25 Channel
UBS
Mongolian National Radio
FM 101.7
FM 100.1
FM 102.5
FM 107.5

Appendix 3: Preliminary Data from the Siberian Marmot (*Marmota sibirica*) Survey on the Eastern Steppe of Mongolia

Methods

North-south line transects were conducted to estimate densities of active and inactive colonies, marmots, ungulates, carnivores and raptors. Road surveys were conducted in two areas when topography prevented line transects. During road surveys, marmots, ungulate, raptors and carnivores were recorded (for statistical reasons, burrow clusters were not recorded). We also participated in a small carnivore study so carnivore scat was collected. The number and size class of other burrows were also recorded. Marmots and raptors are presented as detections per 10 km, ungulates per 1 km and carnivores per 100 km in order to detect trends associated with transects. In addition, the Pearson product moment correlation coefficient was determined between marmots and each other type of wildlife. Overall percent of active burrow clusters detected was low (4.09%). In order to estimate population, we calculated the number of active burrow clusters for the study area (195,225 sq km by 0.2312 burrow clusters per sq km) and calculated the percentage of each size. We calculated the number of individuals by multiplying the number of active burrows by size class by the number of individuals associated with that size class. The estimated total population for the Eastern Steppe, 159,101, is surprisingly low. As an example, in October of 2004, over 117,000 marmot skins were reported confiscated in a three-day raid by the State Professional Inspection Agency. If our numbers are accurate (and 95% inactive burrows suggest they may be), then the Siberian marmot in the Eastern Steppe could be nearing local extinction unless poaching is curtailed.

Table 1: Number and percentage of active and inactive marmot burrow clusters, Eastern Steppe, Mongolia

transect	active	inactive	total	Percent active	Percent inactive
2	0	0	0	0.00%	0.00%
3	0	8	8	0.00%	100.00%
4	7	94	101	6.93%	93.07%
5	5	138	143	3.50%	96.50%
6	20	374	394	5.08%	94.92%
7	14	472	486	2.88%	97.12%
8	14	212	226	6.19%	93.81%
9	23	497	520	4.42%	95.58%
10	7	36	43	16.28%	83.72%
11	6	31	37	16.22%	83.78%
ALL	96	1862	1958	4.90%	95.10%

Table 2: Siberian marmot population estimate for Sukhbaatar and Dornod Aimag

No. of marmots per size class	Total number of active burrow clusters	Number of marmots
1	13,991.9	13,992
4.5	30,240.5	136,082
10	902.7	9,027
TOTAL	45,134.4	159,101

Appendix 4: Information from Preliminary Assessment of Wildlife Hunting and Trade in Mongolia

Wildlife species provide numerous economic benefits to local people in Mongolia. These benefits include a source of protein as well as money from trade for meat, fur, and animal parts used in medicinal markets. For poor people in Mongolia, the availability of wildlife can be crucial to economic and even physical survival – not only does wildlife provide food for the table but it also means that livestock does not have to be slaughtered for consumption and can instead provide benefits such as milk, wool, trade in these products for other crucial items, and a combination of savings, wealth, and insurance. When wildlife becomes scarce, the impact is most dramatic on the poor and on marginalized rural people.

Mongolia's transition in the early 1990s from a relatively strong Soviet-dominated economy with strict controls over hunting and trade to a struggling free-market economy has resulted in a dramatic increase in illegal hunting and trade. A faltering economy, increased reliance on trade with China, porous borders, and little revenue and will for enforcement has led to rapid declines in a range of wildlife. Much of this hunting is for local trade or consumption, but there are a number of species in Mongolia threatened by illegal international trade, and evidence suggests that this threat is growing and spreading to new species. Five examples illustrate the currently unsustainable illegal hunting and trade pressure in Mongolia (from Zahler et al. *In Press*):

Mongolian gazelles (*Procapra gutturosa*) still number around one million animals in Mongolia, and represent one of the great migratory ungulate spectacles in the world and the last such event in Asia. Not surprisingly, they are also the most important wildlife meat and trade source for herders in Mongolia. A recent WCS hunting survey found that local herders in the eastern steppe region alone take as many as 150,000 gazelles annually for personal consumption. Meanwhile, urban dwellers in just one city in eastern Mongolia were estimated to consume approximately 16,000 gazelles a year, while in 2001 the Chinese customs office approved permits for 100 tons of gazelle meat. Given that Mongolian gazelle harvest models suggest a total sustainable off-take of 6%, or 60,000 gazelles a year, Mongolian gazelles may be in the process of experiencing a decline similar to that of the Kazakhstan saiga antelope (see below). This could be exacerbated if there is a commercial switch from saiga to gazelle horns for the Chinese market, and evidence for this ominous trend has been found in the recent increase in price for gazelle horns.

The Mongolian saiga antelope (*S. t. mongolica*) is a distinct subspecies found in the southwestern part of the country. The population of Mongolia's subspecies of saiga antelope has catastrophically declined from over 5,000 to less than 800 within the last 5 years (an 85% drop). The driver in this collapse is the lucrative Chinese medicinal market for saiga horn. The decline in Mongolia follows shortly after a similar collapse in the major populations of saiga in Kazakhstan and Russia, where populations have crashed from over 1 million in the early 1990s to perhaps as low as 40,000 in recent years. The decline is exacerbated by skewed sex ratios due to focused hunting on the horned males, which has negatively affected the populations' breeding system and its ability to recover. The extremely low numbers of saiga remaining in Mongolia make them especially susceptible to stochastic events such as icy winter conditions that could cause mass mortality and potentially drive the subspecies to extinction. Circumstantial evidence suggests that it is the middle class (those with vehicles and money for fuel) who are the primary actors in the illegal trade in saiga horns.

Mongolia's Red deer (*Cervus elaphus sibiricus*) were once common throughout much of the country. Unfortunately, red deer have also declined catastrophically across Mongolia. According to a 1986 government assessment, the population size at that time was approximately 130,000 inhabiting 115,000 square km. The most recent population assessment in 2004 showed that only about 8,000-10,000 red deer now inhabit 15 aimags (provinces) of Mongolia. This is a 92% decline in only 18 years. While habitat loss may play a small role, illegal poaching is the primary reason for this dramatic decline. Much of the poaching and subsequent trade is directed toward the international medicinal market, and include harvesting for antlers (1 kg US\$60-100), male genital organs (US\$70-80), fetuses (US\$20-50), and female's tails (US\$50-80).

Mongolia is home to the world's largest mountain sheep, the argali (*Ovis ammon*). These animals are greatly sought by foreign hunters because of their impressive size and long, spiraling horns. Yet, argali are declining in Mongolia primarily due to an increase in poaching for meat and horns (to trade with China), predation by domestic guard dogs, and competition with domestic livestock. Government figures estimated 50,000 argali in Mongolia in 1975 and 60,000 animals in 1985, but only 13,000 to 15,000 in 2001. This is a 75% decline in just 16 years. Despite being listed as a threatened species both in Mongolia and internationally, argali trophy hunting remains legal in Mongolia and the number of licenses has been increasing, with 80 licenses offered in 2004. Trophy hunting is a lucrative business, with companies offering hunts for US\$25,000-50,000. There are existing laws for returning revenues to local government

for conservation initiatives, but these laws are not being followed. Because of this, controversy surrounds this program, as manifested by growing local opposition, accusations of corruption by the media, and a U.S. lawsuit.

Until recently Siberian marmots (*Marmota sibirica*) were one of the most common mammals of the steppe region in Mongolia, and they were also one of the most important economic wildlife species, providing food, fur, and trade opportunities both within Mongolia and across borders, especially with China. Marmots live in fairly large colonies and may be a 'keystone species' – e.g., they provide burrows for other species, affect vegetation to increase plant diversity, and are a critical part of the food chain. While there are no recent surveys to determine the decline of marmots, all circumstantial evidence points to a critical and catastrophic decline across most of their range in Mongolia. A recent hunting study found that in eastern Mongolia the observed trade volume alone was almost three times the actual hunting quota. Although the government only issues about 100,000 marmot licenses a year, 88,000 marmot skins were found in the markets of just three towns in Mongolia in 2001, while in that same year 200,000 skins were officially imported to China from Mongolia. This is undoubtedly only a fraction of the number of marmot skins that cross the border – for example, in 2003 just two seizures of illegal shipments into China totaled 37,332 marmot skins. In October of 2004, over 117,000 marmot skins were reported confiscated in a three-day raid by the State Professional Inspection Agency, and a State Inspector recommended that marmot hunting be suspended nationwide for two to three years to help control the decline.

Numerous other species in Mongolia are also under extreme pressure from unsustainable hunting. For example, brown bears (*Ursus arctos*) are disappearing across Mongolia due to demand bear body parts in the medicinal trade. A set of four paws can be sold for US\$400-500 on the black market, while a bear gall-bladder sells for US\$150-200 and the skin for US\$200-300. In October 2004 it was reported that three Vietnamese nationals were captured attempting to smuggle 80 bear gall bladders out of Mongolia. Even if this were to be the only smuggling effort involving brown bear parts, it is still likely to be a sizeable fraction of the brown bears left in Mongolia. For the wild ass or khulan (*Equus hemionus*) a survey in 1999 put the total population in Mongolia at 60,000, but a more recent survey estimated that there were now less than 20,000 khulan in the country. This is at least a 60% decline in less than 5 years. Moose and wild boar (*Sus scrofa*) are considered to be declining in the north, and ibex (*Capra sibirica*), lynx (*Lynx lynx*), red fox (*Vulpes vulpes*), corsac fox (*V. corsac*), otter (*Lutra lutra*), sable (*Martes zibellina*), wolverine (*Gulo gulo*), and Pallas' cat (*Otocolobus manul*) are all under threat and likely to be declining. These species are heavily hunted throughout their range for skins and for the international trade in body parts, and in most cases the hunting occurs outside of the legal requirement for permits or quotas. As these species decrease in number, hunters and traders are already switching to other species such as roe deer (*Capreolus pygargus*) and even squirrels.

Appendix 5: Draft Action Plan for the Mongolian Gazelle

ACTION PLAN FOR MONGOLIAN GAZELLES

Objective	Program	Activity	Organization Delivering	Timetable				
				2005	2006	2007	2008	2009
1. Restore Habitat, Range and Populations	1. Conduct Initial Nationwide Survey To Establish Current Population of Mongolian Gazelles	1. Conduct initial nationwide aerial survey according to appropriate and accepted international scientific protocol for determination of population of Mongolian gazelles throughout Mongolia.	WCS		✓			
		2. Identify through initial aerial surveys discrete populations throughout county.	WCS, MAC		✓			
		3. Conduct ground surveys in conjunction with initial aerial surveys to 'ground truth' aerial surveys and to establish numbers of each discrete population.	MAC	✓	✓	✓	✓	✓
		4. Conduct genetic analysis of each discrete population to determine if there is a biological basis for managing populations separately	WCS		✓			
		5. Collect and monitor information through aerial and ground surveys on gazelle habitat for each discrete population, including	GOM, MAC, WCS		✓	✓	✓	✓

		human and domestic animal populations, presence of man-made structures or barriers, areas of overgrazing and degradation, types of plants and grasses and availability of water.						
		6. Collect available information on past population, distribution and habitat of Mongolian Gazelle for comparison with results of aerial and ground survey.	MAC, WCS	✓				
		6. Publish results of initial surveys.	WCS		✓			
		7. Identify funding and technical support for Activities 1.1.1-6.	GOM, WCS	✓				
	2. Assess Feasibility of Restoring Mongolian Gazelle Populations to Appropriate Levels in Different Parts of its Range	1. Establish “appropriate” levels of Mongolian Gazelle populations in the Range States based on data collected from Activities 1.1.1-6 and through the Gazelle Working Group discussed in Objective 3; models should incorporate both ecological and social aspects of appropriateness.	Governments of Mongolia, China, and Russia; MAC; WCS		✓			
		2. Assess the practical possibilities to increase Mongolian Gazelle populations across its range and in the Range States by determining opportunities, costs, timeframe, stakeholders’ involvement, major hurdles and difficulties.	Governments of Mongolia, China, and Russia; MAC; WCS		✓			
		3. Determine which populations of Mongolian gazelle are in need of restoration and develop restoration plans for these	GOM, MAC, WCS	✓	✓			

		populations.						
	3. Establish Standardized, On-going Survey and Monitoring Programs In Key Areas	1. Based on data from nationwide survey, identify key areas for ongoing survey and monitoring program.	GOM, MAC, WCS	✓				
		2. Design and implement ongoing survey and monitoring program in key areas according to appropriate scientific protocol and international best practice, such programs to include aerial and ground surveys for population counts; determine appropriate season and period (e.g., yearly, every other year, etc.) for surveys.	GOM, MAC, WCS	✓	✓	✓	✓	✓
		3. Design and implement training programs for monitoring teams to ensure consistent and accurate results and documentation of ongoing survey and monitoring programs.	GOM, MAC, WCS		✓			
		4. Hold regular workshop to: a) discuss results of monitoring and survey program; b) revise program as necessary and to focus on crucial issues; c) ensure continued consistency in each survey and monitoring program; d) provide additional training as necessary; and e) publish yearly results of ongoing monitoring and survey program with a focus on calling public and government attention to areas or issues of importance.	GOM, MAC	✓		✓		✓
		5. Identify funding and technical support	GOM, MAC,	✓	✓			

		for activities 1.3.1-6.	WCS					
	4. Continue and Expand Ongoing Field Studies of Biology of Mongolian Gazelles, Including Breeding Biology and Migration Patterns	1. Identify through current and past field studies the key features, including food, shelter and climate conditions, of past and present habitats.	MAC, WCS	✓	✓			
		2. Study migration patterns and conditions to help predict conservation needs for future migrations.	WCS, MAC	✓	✓	✓		
		3. Continue to study breeding biology including requirements for suitable rutting and calving grounds and identification of critical areas for these activities.	WCS, MAC	✓	✓	✓		
		4. Provide training for Mongolian students and biologists in how to conduct field studies according to international best practice.	WCS, MAC	✓	✓	✓		
		5. Identify additional funding and technical support for activities 1.4.1-5.	GOM, WCS	✓				
	5. Analyze and Propose Revisions to Protected Areas to Better	1. Using data collected through Programs 1–3 above, conduct study of current Protected Areas to assess whether they cover key habitats for Mongolian Gazelles, including corridors for migratory routes.	GOM, WCS	✓				

	Protect and Restore Mongolian Gazelle Habitat and to Ensure Adequate Migration Corridors							
		2. To extent that the current Protected Areas do not adequately cover key Mongolian Gazelle habitat, prepare proposals for revisions and additions to Protected Areas and present proposals to appropriate government agency.	GOM, WCS		✓			
		3. Address potential for new landscape level protected area system within Mongolian gazelle range to address issue of large-scale gazelle movements and needs.	GOM, WCS					
	7. Strengthen Stakeholder Involvement and Investment in Mongolian Gazelle Conservation	1. Hold regular meetings with Protected Area buffer zone counsels and other community groups to share and discuss information on relevant issues related to Mongolian Gazelle conservation and management.	GOM, WCS	✓	✓	✓	✓	
		2. Establish local student projects and volunteer teams for strengthening awareness of Mongolian Gazelle conservation.	WCS		✓			
		3. Collect information on Mongolian Gazelle threats, conservation issues, and management options and create educational	WCS, GOM	✓	✓	✓		

		tools (brochures, films, articles) to be used for conservation education focused on local communities, tourists, and the general Mongolian population.						
2. Address Known Threats to Mongolian Gazelle and Current Habitat.	1. Strengthen Poaching and Hunting Regulations and Enforcement.	1. Hold workshop in 2005 on enforcement of all hunting and poaching laws and regulations. Goals of workshop will be: a) identify funding sources for hiring, training and equipping enforcement personnel in key areas throughout Mongolia and devise plan for applying for and obtaining funding; b) prepare guidelines for number and type of personnel needed for more effective hunting and poaching enforcement throughout Mongolia; c) prepare guidelines for key types of enforcement activities needed such as patrolling both Protected Areas and open grazing/herder lands, patrolling markets for illegal wildlife products, international border checks, checks of trucks and commercial vehicles on roads for illegal wildlife; d) prepare plan for hiring and training of needed personnel, d) review hunting and poaching laws and regulations and propose revisions, focusing on penalties and punishment such as seizure of illegal product and equipment and vehicle, heavy fines and financial rewards for reporting of illegal activities; e) develop a confiscation policy for Mongolian Gazelle products and ensure that benefits of reailed or auctioned products are reinvested in Mongolian Gazelle conservation; e) obtain cooperation from all levels of relevant government agencies and departments,	GOM, WCS	✓				

		including the military; f) design public awareness campaign about effects of illegal poaching of wildlife.						
		2. Based on data collected from Activities 1.1.1-6 and 1.2.1, establish appropriate legal off-take based on existing local population numbers, recommended population levels, and new harvest models based on latest biological information.	GOM, MAC		✓			
		3. Incorporate recommendations from Workshop described in Activity 2.1.1 and new off-take assessment from Activity 2.1.2 as legal rulings, identify implementation agencies, create implementation plan including funding for activities and interventions, and begin implementation.	GOM		✓			
		4. Develop and implement public awareness campaign to increase knowledge of poaching threats to Mongolian Gazelle.	WCS	✓	✓	✓	✓	✓
		5. Investigate feasibility of creating “herder cooperatives” to locally and jointly manage and control local poaching.	WCS, IPECON	✓				
	2. Determine Need for Continued Ban On Commercial Hunting	1. Use data collected from 2.1.1-3 above to determine the need for a continued ban on commercial hunting of Mongolian Gazelles; ban to be reviewed every five years based on latest available data on populations, thresholds, and harvest models.	GOM, MAC	✓				✓
		2. Create public awareness campaign to educate the public about the damage that	GOM, WCS	✓				

		illegal commercial hunting causes to the Mongolian gazelle population.						
	3. Address Other Human-Induced Threats to Mongolian Gazelle	1. Overgrazing and competition with livestock: Conduct study or collect existing information regarding amount of livestock that can be sustained on [acre/hectare] of average steppe habitat and propose guidelines or regulations regarding sustainable grazing practices.	GOM		✓			
		2. Overgrazing and competition with livestock: Conduct public awareness campaign of impacts and consequences of overgrazing and how to prevent it.	GOM, WCS		✓	✓	✓	✓
		3. Structure and barriers: Provide input on development of structures and barriers, including roads, railroads, fences, buildings, mining operations and large-scale agriculture so that such structures have minimal impact on Mongolian Gazelle habitat and migration routes.	GOM, WCS	✓	✓	✓	✓	✓
		4. Structure and barriers: Conduct public awareness campaign on effects of roads, railroads, fences, buildings, mining operations and large-scale agriculture on Mongolian Gazelle and other wildlife.	WCS, GOM		✓	✓	✓	✓
		5. Pollutants: Conduct study to determine effect of pollutants from mining and industry on Mongolian Gazelle and critical habitat.	WCS			✓		
	3. Conduct	1. Identify funding and technical support	WCS	✓				

	Study of Diseases Affecting Mongolian Gazelle	for conducting a study on diseases affecting Mongolian Gazelle and interaction of diseases between Mongolian Gazelle, other wildlife, livestock and humans.						
		2. Conduct studies on diseases affecting Mongolian Gazelle and interaction of diseases between Mongolian Gazelle, other wildlife, livestock and humans; propose guidelines for reducing instances of identified diseases.	WCS			✓	✓	✓
3. International Cooperation	1. Develop a Regional Management Plan for Mongolian Gazelle.	1. Establish Mongolian/Russian/Chinese working group on conservation and management of Mongolian Gazelle (“Working Group”).	Governments of Mongolia, China, and Russia	✓				
		2. Working Group shall provide central coordination of international information exchange on conservation of Mongolian gazelle.	WG	✓	✓	✓	✓	✓
		4. Working Group shall ensure that standardized survey techniques are used in all Range States for comparison and joint analysis.	WG	✓	✓	✓	✓	✓
		3. Working Group shall identify key Mongolian gazelle habitats that cross international borders.	WG	✓				
		4. Working Group shall develop plans to create trans-boundary protected areas with consistent levels of protection and restrictions that coincide with key	WG		✓			

		Mongolian gazelle habitats.						
		5. Working Group shall compare Chinese, Russian and Mongolian hunting and anti-poaching laws that affect Mongolian gazelle and its habitat and propose changes in laws to create a consistent level of protection for Mongolian gazelles in Russia, China and Mongolia.	WG	✓	✓			
		6. Working Group shall establish a joint public relations effort in which the three countries cooperate in preparing and sharing media and materials that educate the public on the need to conserve the Mongolian gazelle.	WG		✓	✓	✓	✓
		7. Working Group shall study and propose at the 2005 Enforcement Workshop, described above in 2.1.1., methods for international cooperation ensuring enhanced and uniform enforcement of hunting and anti-poaching laws.	WG	✓				
		8. Create MOU to be signed by the relevant Government agencies in Mongolia, China and Russia for the conservation and restoration of Mongolian Gazelle and Mongolian Gazelle habitat which shall include, at a minimum, items 3.1.1 through 7.	Governments of Mongolia, China, and Russia; MAC. WCS	✓				

Key: GOM = Government of Mongolia
MAC = Mongolian Academy of Sciences
WCS = Wildlife Conservation Society
WG = International Mongolian Gazelle Working Group (Mongolia, China, Russia)

Appendix 6: Project Reports to Assist in the Establishment of Necessary Management Mechanisms

Protected Areas Assessment Report: In June, WCS published and distributed the final report for the Eastern Steppes Protected Areas Assessment. This was a field review of 10 protected areas on the Eastern Steppe, including Nomrog, Dornod Mongol, and Mongol Daguur Strictly Protected Areas, Tosonkhulstai, Yakhi Nuur, Khar Yamaat, Ugtam, and Lachinvandad Nature Reserves, Ganga Nuur, and Onon Balj National Park. A team used internationally accepted protocols to assess Protected Area agency capacity, needs, threats, and local community perspectives of protected areas. The 62-page report was translated into Mongolian and made available to government agencies and other organizations to assist them in determining steps to improve protected areas management. It is available to others upon request.

Report on the International Workshop on Brandt's Vole Management: In 2004, WCS collaborated with WWF, ESBP, and NUM to participate in a working group to present recommendations to the Parliament's Standing Committee on the Environment on new approaches to Brandt's vole management. WCS participated in a two-day working group with university experts, toxicologists, and policy experts, and we wrote the first draft of a set of recommendations for safer and more effective management of these rodents. In order to develop specific solutions to the problem, WCS co-hosted an international workshop on 27-28 September, 2004 on the issue of Brandt's vole management with WWF-Mongolia, the UNDP-GEF Eastern Steppe Biodiversity Project, and the UNDP-GEF Sustainable Grassland Management Program. The workshop was an important opportunity to learn from international experience and, in collaboration with relevant government staff and other stakeholders, to develop a set of very specific recommendations. Members of Parliament, the Ministry of Nature and Environment, the Ministry of Food and Agriculture, the Ministry of Health, the Academy of Sciences, the National University of Mongolia, and a range of NGOs and concerned citizens were involved in the workshop. International participants included experts from the United States, Great Britain, and Australia. The final report on results from the 2004 WCS-led International Workshop on Brandt's Vole Management has now been translated and printed in an English and Mongolian version. This 112-page report documents the September, 2004 workshop held to determine international best practice recommendations for Brandt's vole management. Recommendations include phasing out the poison Bromadiolone by the end of 2005, using rangeland management to control vole outbreaks (voles are short-grass specialists), and developing modern and replicable scientific pilot studies to determine which of the many alternative practices will be most useful for controlling this highly cyclic rodent. A major result of this workshop has been the decision by the Mongolian Government to ban spraying of Bromadiolone on the steppes of Mongolia. The final report is available upon request.

Important Bird Areas Surveys Report: The WCS Program, in collaboration with the Royal Society for the Protection of Birds (RSPB) and the National University of Mongolia, performed a series of Important Bird Area Surveys (IBAs) in 2004 to identify areas of critical importance for globally rare and endangered breeding species as well as sites critical to hundreds of thousands of migratory birds using the previously undocumented Eastern Mongolian Migratory Flyway. This was the first avian survey in Mongolia to use highly rigorous and replicable data collection methods, in this case based on RSPB IBA standards. During the survey Mongolian (and Russian) biologists, resource managers, and university students were trained in this methodology to improve in-country capacity for sound research and analysis. The 119-page report is being translated into Mongolian and will be distributed to relevant agencies and organizations. Outputs from the report will include new IBA designations and recommendations for new protected areas based on modern, replicable scientific survey methodologies. Data from these surveys will be published in a forthcoming book on Mongolian IBAs.

Takhi Reintroduction Feasibility Study Report: In the fall of 2004 WCS sent an international team to perform a Przewalski's horse (takhi) reintroduction feasibility study of the Eastern Steppe. Takhis are considered to be a wild offshoot of the ancestor to the domestic horse. They were driven to extinction in the wild in the 1960s, but zoos maintained a stock of these horses in captivity and approximately 10 years ago captive takhis were reintroduced to two locations in the Gobi Desert region of western Mongolia. All of these takhis have been from European zoos – United States takhis have yet to be used for reintroduction efforts. The final report is being translated into Mongolian and will be distributed to any interested organizations, including Mongolian government agencies and United States AZA members.

Report on a Survey of Large Mammals in Eastern Mongolia's Nomrog Strictly Protected Area: The report of a 2004 survey of ungulates in Nomrog SPA is in the final editing stages and will be completed and submitted for translation and printing in both English and Mongolian. This report documents a 2004 study of large mammals, especially deer species, in what may be the last remaining pristine piece of Manchurian steppe ecosystem left in the world. A total of 40 moose, 71 red deer, and 291 roe deer were seen during the two-month survey, as were numerous other wildlife species. Threats were also documented, including extensive poaching from Chinese crossing the border into the SPA. Plans have been developed to train border guards in anti-poaching efforts this year.

Mongolian Gazelle Management and Action Plan: This plan was developed from the three-day International Mongolian Gazelle Research Symposium/Management Workshop held by WCS on October 25-27, 2004. Attendees included all local and international research biologists currently involved in gazelle studies in Mongolia, Russia, and China, as well as relevant government and agency officials from each country responsible for management of wildlife in regions inhabited by gazelles. The main goal of the 2004 three-day gazelle management workshop was to create recommendations that will ensure long-term sustainable gazelle management. Mongolian gazelle research findings that are critical to inform management decisions were presented including population size, trends, breeding biology, migration, and behavior; a priority-setting exercise was held to determine future research and conservation needs (lead by WCS Living Landscapes Program staff from New York); and a separate outcome was the creation of an international Mongolian Gazelle Working Group. We are currently drafting the Management/Action Plan in cooperation with the Mongolian Academy of Sciences, which is the official research arm of the Mongolian government. With input from diverse and respected workshop attendees and the seal of approval from the Academy, we hope that the management plan will have significant influence on decision-makers throughout the Mongolian gazelle's range.

Participants at *The Livestock, Wildlife and Human health Interface in Mongolia: a participatory workshop* held in Ulaanbaatar, June 2005.

